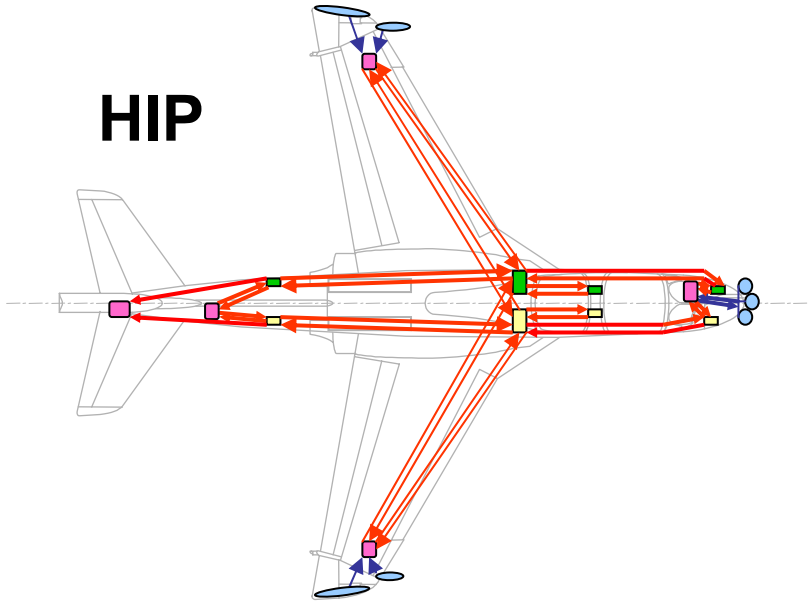
ASN(RDA) FUNDING CANDIDATES

Acquisition Community	Title	Description	Funding ($M)
PEO (T)	**A)** Highly Integrated Photonics Wave Division Multiplexing & Support Components	Standards and testing to enable use of optical components on aircraft and surface ships	4.8
PEO (T)	**B)** Tube Transmitter for Advanced Hawkeye	Reduced weight, increased capacity transmitter power amplifiers	4.7
PEO (W)	**C)** Quick Response Tomahawk Mission Planning	Rapid mission route replanning for time critical and relocatable targets	1.1
PEO (W)	**D)** Low Cost Guided Imagery Rocket (LOGIR)	Low cost optical guidance package for existing missiles	5
PEO (W)	**E)** Precision Strike Navigation / Inertial Measurement Unit (PSN / IMU)	Improved intertial navigation unit for JSOW	2.5
PEO Ships	**F)** Fuel Cell	Diesel fuel reformer for ship power source with reduced wieght and volume requirements	6.1
PEO Ships	**G)** Fiber Optic Gigbyte Network (FODMS GIGE)	Wide bandwidth Gigabit Ethernet backbone	13
PEO Submarines	**H)** Acoustic Comms	Extended range, high bandwidth submerged communications	2.5
PEO Submarines	**I)** Friction Stir Processing	Material processing technique to reduce production cost	2.38
PEO (IWS)	**J)** Low Cost Conformal Array	Active/passive acoustic array to improve shallow water capability	3
PEO (CV)	**K)** Aviation Weapons Inventory Mgt Sys (AWIMS)/ Electronic Ouija Board	Weapons management and tracking system to improve weapons throughput and increase sortie rate	1.85
PEO (CV)	**L)** BUSBARS Electrical Distribution	Replacement for power (13.8 kVA) cables to reduce volume, weight and EMI	1
PEO (CV)	**M)** Freshwater Flush Sewage Mgt System	Wastewater treatment to reduce storage volume and meet environmental requirements	3.5
PEO (LMW)	**N)** Autonomous Undersea Vehicle	Low-cost, reduced size UUV for surface launched littoral missions	3.5
DRPM (AAAV)	**O)** Portable Fluid Analyzer	Lubricating fluid analyzer giving real-time results to reduce maintenance costs and improve maintenance response times	2.44
TOTAL:	**1 Percent (in millions)**		**$57.37**

HIGHLY INTEGRATED PHOTONICS (HIP) WAVE DIVISION MULTIPLEXING & SUPPORT COMPONENTS FOR THE EA-6B



- Primary Optical Bus Coupler Units (OBC)
- Secondary Optical Bus Coupler Units (OBC)
- RF Units

Mission Need:
- Copper data bus technology can't meet continuing demand for processing power
- Additionally, increasing components and limited space limits growth of systems
- Combination of few aircraft available and increased target sophistication require increase jamming efficiency

Technology Need:
- Develop & integrate fiber optic system to increase power, decrease weight, & reduce space requirements

Stakeholders:
- PEO (A), DARPA, ONR PEO (T) actively marketing this within industry and DoD

Benefits/Payoff:
- Growth opportunity for all aircraft
- Key technology enabler for 50% increase in per-sortie warfighting capability (HIP allows 3 transmitters vice 2)
- Risk Reduction for subsequent application (aircraft & UAV)
- Leverages $18M from DARPA

Technology

RF over fiber for communication with ALQ-99 pod transmitters

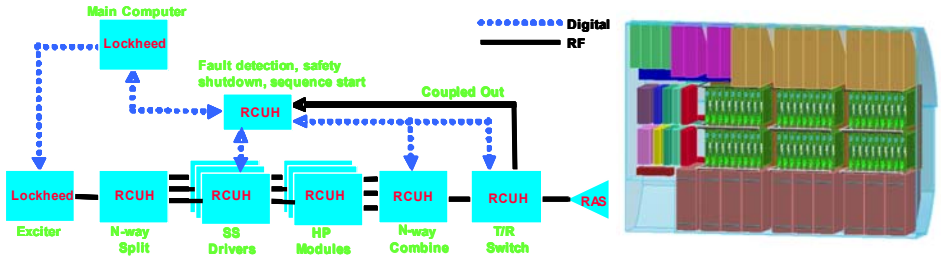
- Highly Integrated Photonics (HIP) RF and digital devices and supporting interconnections using single mode Dense Wavelength Division Multiplexing on a single optical backbone
- Leverages off Flight testing Optical Communication Using open Standards (FOCUS)

Requesting $4.8M for HIP

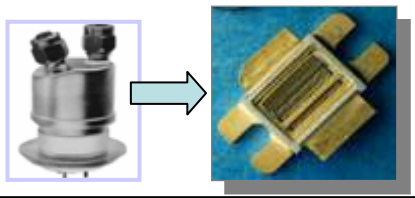
Receipt of funding	10 Oct 2003
Initiate contract award	11 Oct 2003
Industry Day	10 Dec 2003
Industry selection	12 Jan 2004
Preliminary Design Review	6 Jun 2004
Critical Design Review	10 Oct 2004
Contractor labs	Jan - Apr 2005
Government lab	Apr - Jul 2004
Aircraft test/demo	Jul – Oct 2004

ADVANCED HAWKEYE TUBE-BASED ALTERNATE TRANSMITTER

Efficiency yields: Lighter, smaller, cooler, more power, less complex, more growth.
COTS yields: Cheaper, more reliable, more available.

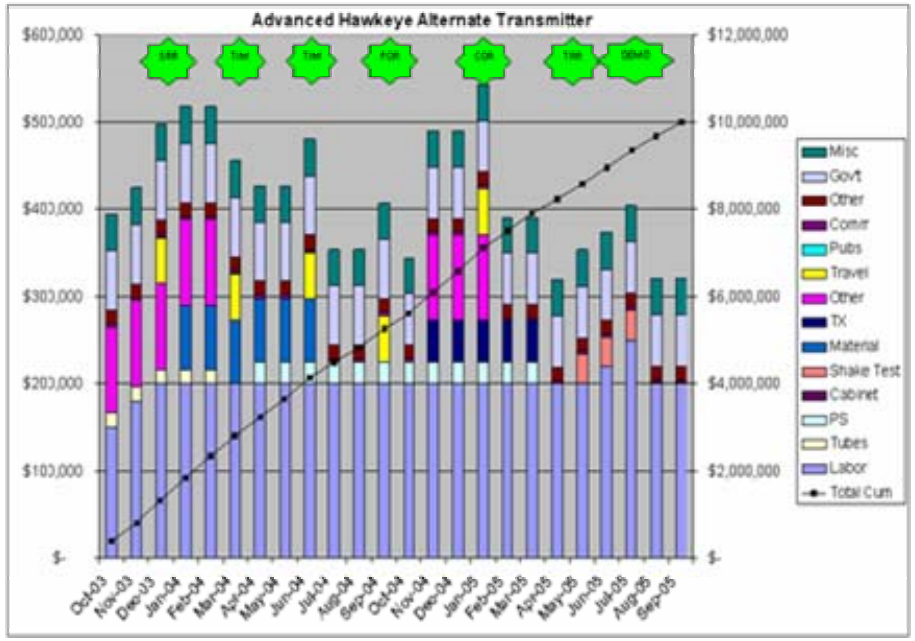


Tubes	Silicon Carbide
1200-1700 lbs	2200-3000 lbs
~90 modules	~600 modules
~ 40 ft^3	~55 ft^3
~150% power	100% power

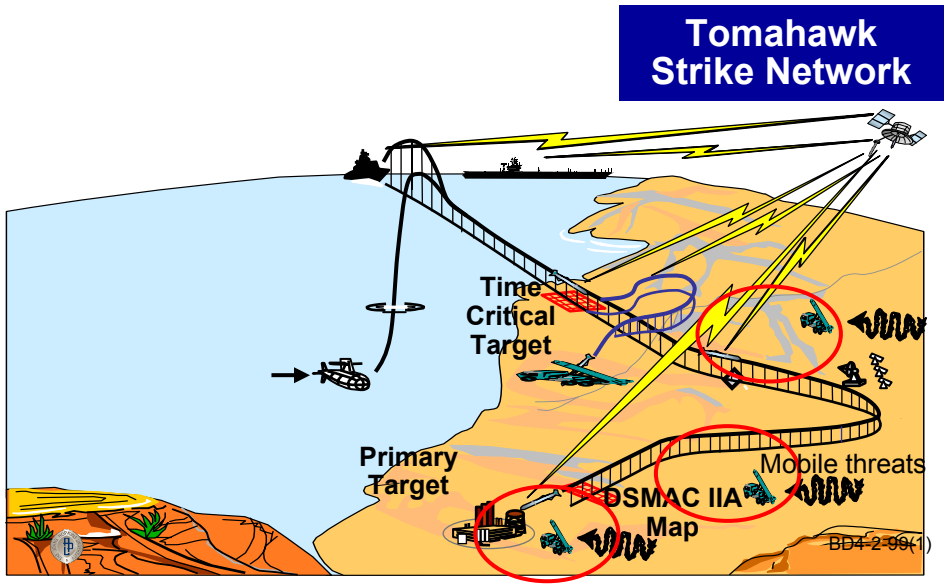


- **Mission Need:** Significantly reduce overall aircraft weight, allow growth for power, cooling, and volume for the AHE program.
- **Technology Need:** More efficient power amplification, larger user based COTS product.
- **Stakeholders:** PEO(T), ONR, ASN
- **System Application:** E-2 Advanced Hawkeye
- **Performing Activity & Process Implementation Site:** PMA-231, Research Corporation University of Hawaii
- **Benefits/Payoff:**
  - Meet AHE weight, power, volume, cooling requirements
    - Allows significant growth in key areas
  - AHE weight valued at $135/lb = $63M to $135M
  - Overall weight reduction in AHE program has GFE and CFE items.
    - GFE items include CEC block II & JTRS

- Vacuum tubes have improved over the last 30 years
  - Indirectly heated oxide coated cathode ⇒ superior service life
  - Metal/ceramic construction ⇒ exceptional shock resistance
  - Higher device efficiency
- Limited power handling of solid state devices
  - Difficult to obtain > 1.5 KW per device
  - Gain limited to ~ 9 dB device ⇒ require more stages
  - Need for heat spreaders and internal combiners
- Tubes exhibit tremendous power handling
  - >13 dB gain, 11 kW peak out of a single power triode
  - No power combiners ⇒ >50% end to end efficiency possible
  - Operate at temperatures where silicon is destroyed
- Electromagnetic models & microwave design tools enable a new “twist” on old designs



QUICK RESPONSE TOMAHAWK MISSION PLANNING



- **Mission Need:**
  - Tomahawk Mission Planning currently does not meet fleet timeline requirements
- **Technology Need**:
  - Current auto-routers require a static "cost-map" of the battle space which includes threat and routing restrictions
  - The changing threat picture and dynamic TLAM/TACAIR route de-confliction issues make the current auto-router ineffective. Time consuming manual methods must be used.
- **Technology Solution:**
  - A Genetic Algorithm-based auto-router will effectively reduce planning time because it does not require a pre-generated "cost-map" and can generate routes sensitive to the real-time threat picture and route de-confliction requirements
- **Impact:**
  - A Genetic Algorithm-based auto-router can generate routes sensitive to the current tactical picture
  - A 50% reduction in effective route planning time can be achieved

Technology:

- Inspired by evolution, a Genetic Algorithm "evolves" progressively better solutions by spawning new solutions from successful parents
- Prototyped under an SBIR effort with Scientific Systems Company, Inc. (SSCI), Phase I & II
- Evaluates thousands of candidate solutions (routes) in 1-2 minutes
- Does not require a pre-generated cost map, so it uses the latest threat and de-confliction constraints
- Routes validated as suitable by TLAM technical staff

Activity	FY 04	FY 05	FY 06	FY 07
Prototype development				
Route Analysis				
User Assessment				
TC2S 4.2 Integration				
Test & Evaluation				
Fleet Release				
ASN(RDA) funding	$600K	$500K		
OPNAV (N76) funding	$250K	$250K	$250K	
Total	**$850K**	**$750K**	**$250K**	

LOW COST GUIDED IMAGERY ROCKET

Mission Need:
- Navy cannot effectively counter coordinated attacks by small boats or weaponized trucks

Technology Need:
- Accelerate the integration of guidance systems and image based targeting into inexpensive rockets

Stakeholders: PEO (A), PEO (W), NAWC China Lake

System Application: Hydra Rocket, possibly Zuni Rocket

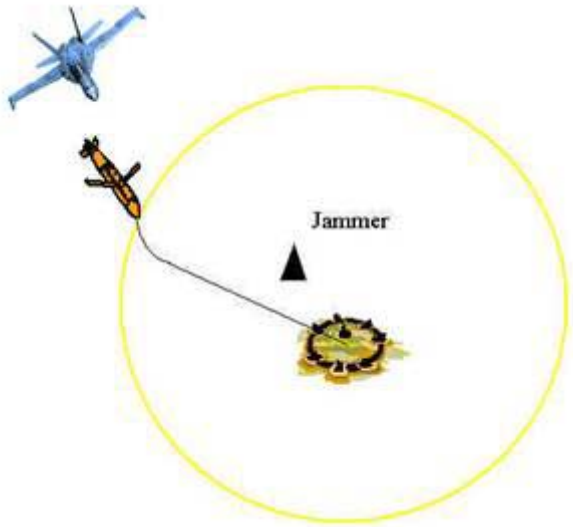
Performing Activity & Process Implementation Site:
- NAWC China Lake

Benefits/Payoff:
- Meets MH-60R Swarming threat requirement
- 433% Lower cost per kill
- >375% More kills per sortie
- More weapons on target at lower cost with greater efficiency

Technology:
- NAVAIR – China Lake scientists and engineers have been working on LOGIR since 2001
- ONR Code 35 Recommendation and Support
- RTT will deliver:
  - Fire and forget guidance and control algorithm
  - Automated target acquisition capability
  - Improved targeting image stabilization
  - Reduced Risk for proceeding to SD&D

Weapon System Tasks		
Signal Processing	Jan 04 - Sept 04	$2000K
A/C to Weapon Integration	Jan 04 - Sept 04	$500K
Inertial Measurement Unit	Jan 04 - Sept 04	$400K
Engineering to Cost	Jan 04 - Sept 04	$1000K
		$3900K
Aircraft Integration Tasks		
Optical Correlation Algorithm	Oct 03 - Sept 04	$750K
Electronic Image Stabilization	Oct 03 - Jul 04	$250K
ICD	Oct 03 - Dec 03	$100K
		$1100K

PRECISION STRIKE NAVIGATOR – INERTIAL MEASUREMENT UNIT (PSN / IMU)



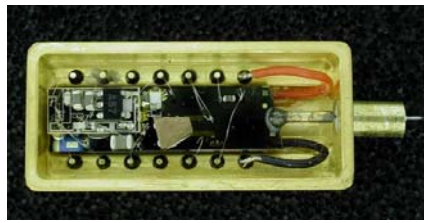
Requirement

The fleet desires a robust SOPD capability in a GPS CM environment. Recent operations have verified an evolving GPS CM threat. GPS Anti-Jam (AJ) for expendable applications must be affordable. These technologies must be available for the near term navigation upgrades mandated by DoD (GPS security) in order not to require numerous weapon configurations in the fleet and to preclude costly operation requalification.

• Finalize the Design Gyro Design (Draper) IMU Design (L3) Special Equipment Design	$ 800K
• Parts Procurement	$ 700K
• Integration, Assembly, Test of Prototype IMUs, Draper Support	$ 900K
• Raytheon Test Program	$ 100K
Total	**$2500K**

Technical Approach:

- Reduce cost of Fiber Optic Gyro Based IMUs
  Polymer on Silicon Hybrid Technology
  - Automated Semiconductor Processing Technology
  - Integration of Devices Reduce Alignment Errors



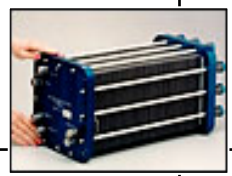
Transceiver Device w/ Polymer Coupler

Polymer on Silicon Polarizing Modulator

FUEL CELL PROGRAM: DD(X) LEAD SHIP

Problem: The DD(X) ship design requires an additional forward power generation source to meet survivability and vulnerability requirements on the lead ship. Use of traditional power sources (diesels ,gas turbines) results in significant adverse ship weight, volume and arrangement impacts.

Solution: An existing ONR ship service fuel cell (SSFC) program will be accelerated and modified to demonstrate next generation diesel fuel reforming technology that enables the SSFC to meet power, location and schedule needs of DD(X) lead ship with minimal impact to current ship design.

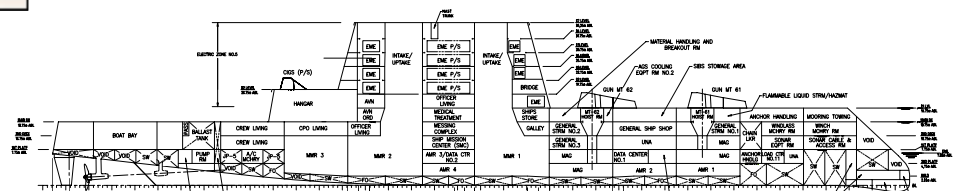


Technology:
ONR 33X. NAVSEA 05, and NSWCCD 90 have been developing diesel fueled SSFC power plants. A 500 kW integrated fuel processor and a 625 kW molten carbonate system will be demonstrated 2Q FY04 and 4Q FY04 respectively. Advanced fuel reforming and sulfur removal technology is required to enable SSFC to meet DD(X) lead ship performance, environmental and space requirements.

RTT will deliver:

- Integrated desulfurizer and reformer validation
- PEM and Molten Carbonate system characterization
- DD(X) fuel cell installation integration study
- Preliminary design for DD(X) lead ship fuel cell EDM

TASK	PERIOD of PERF	FUNDING
Characterize PEM/IFP	FY 04	$ 0.450M
Validate integrated desul-furizer/reformer/ PEM ops	FY 04/05	$2.850/ 0.825M
Fuel Celll ship integration installation study	FY 04/05	$0.200/0.100M
DD(X) lead ship EDM preliminary design	FY 05	$0.600M
Characterize molten Carbonate system	FY 04	$0.750M
		FY 04 total $ 4.6M
		FY 05 total $ 1.5M



RTT Fuel Cell Transformational Initiative:

- Resolves important DD(X) power needs
- Resolves important DD(X) survivability needs
- Provides higher efficiency
- Inherent quiet operation
- Continuous base load operation
- Reduces existing system complexity

FODMS TRANSITION TO GIGABIT ETHERNET

Existing Fiber Optic DMS plant on FLT IIA DDGs upgraded to GiGabit Ethernet

A smart investment of resources today :

- Quickly achievable with minimal shipbuilder costs
- Customers in both new construction and backfit
- Build on foundation of a proven performer (FODMS)

- **Mission Need:** Significantly Increase Bandwidth of internal data network on DDG 51 class ships to enable reduced manning initiatives
- **Technology Need:** Develop and qualify components to transition FODMS from FDDI to GiGE
- **Stakeholders:** PEO SHIPS (400D/400F), N76
- **System Application:** primarily DDG 51 (possibly CG 47 conversion; applicable to all surface ships)
- **Performing Activity & Process Implementation Site:** Bath Iron Works, Northrop-Grumman Ship Systems, Boeing, NSWC Dahlgren, NAVSSES Philadelphia

Tasks and Funding:

Specific Tasks & Transition Program Milestones:

- FY 04: Development of GEC for FODMS.
- FY 04/05: Development of GEM-S for FODMS.
- FY 05: Modification of Maintenance Group software to accommodate new gigabit Ethernet components.
- FY 05/06: Qualification Testing.

FY04	FY05	FY06	FY07	FY08	FY09
6.5M	6.5M	0.0	0.0	0.0	0.0

Benefits / Payoff:

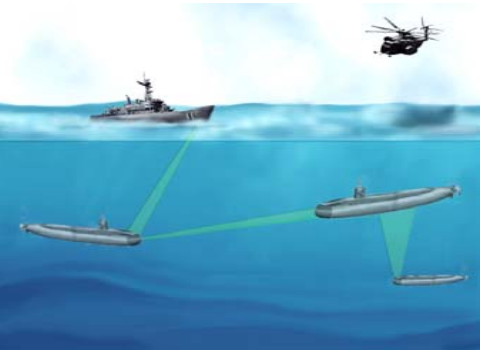
- Achievable implementation on FY04-05 DDG 51s
- Reduces risk for implementation during DDG Modernization
- Provides required bandwidth for DDG Modernization initiative that will provide estimated $5B savings in operation over remaining life of the DDG 51 class

Transition Plan:

- FODMS to GIG-E upgrade submitted as part of POM 06 funding request; to be fielded on FY 05 Ships (DDG 110-112) using SCN; Cost to be borne in SCN which will result in OPN savings.
- Also, submitted as part of Mid-Life upgrade proposal for DDG 51-109.

ACOUSTIC COMMUNICATIONS (ACOMMS)

Comms at Speed & Depth



- Digital
- Two-way communication
- Encoded
- Supports voice, text, image
- High data rate demonstrated
  - 2400 bps at 35 nmi (MF)
  - 9600 bps at 5 nmi (HF)
- High Doppler Tolerant
- Use existing sensors on platforms to communicate
- COTS HW compatible with ARCI

PEO SUB #1 priority

MOA Ready for Signature

Mission Need: Rapid communications with SSN, SSBN, SSGN, UUV and all levels of command while operating at tactical speeds and depths.

Technology Need: Acoustic Communications for Comms at Speed and Depth

Stakeholders: Requirement: CINCLANTFLT; Sponsor: N77; Acquisition: PEO SUB, PEO IWS, PEO LMW

System Application: SSN, SSGN, SSBN, UUV, SDV, ASDS, DDG, Buoy, ADS, SH-60, ALFS

Performing Activities: NUWC-RI, BAE-NH, DDL-CT, LMCO-VA

Benefits/Payoff:

- ACOMMS enables SEAPOWER 21and FORCEnet initiatives for global connectivity.
- Directly Supports Command & Control Of Assets For Coordinated ASW.
- Fulfill requirement for UUV mission.
- SSN-SDV comms is critically needed for the War on Terror

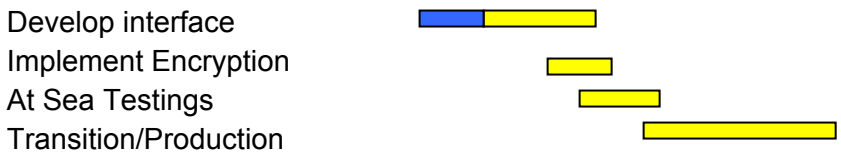
Options

Fiber Optic Tether: constraint by length of cable
RF Antenna: Submarine cannot operate at depth
Underwater Laser: extremely short range, depends on turbidity
Underwater acoustics: support range and data rate required. Options are:

Technology	Range	Date Rate	Doppler	Media	System Cost
Telesonar	3nmi	1-1000bps	5kts	Text	?
ACOMMS	5-35 nmi	2400-9600bps	28 kts	text, voice, image	$50K
HAIL	5nmi	100bps	5kts	text	$170K

- ACOMMS Coherent Communication:
  - Secure, High data rate, Bandwidth efficient
  - Tracks Multipath and Doppler adaptively for robust performance in harsh acoustic environments
- Technology developed, extensively tested, ready for transition

ACOMMS: FY03 FY04 FY05 FY06 FY07



	FY03	FY04	FY05	FY06	FY07
ASN Funding	**0.0**	**1.5**	**1.0**	**0.0**	**0.0**
Interface Development	0.0	1.0	0.2	0.0	0.0
Encryption Implementation	0.0	0.2	0.3	0.0	0.0
Sea tests	0.0	0.3	0.5	0.0	0.0
Program	**0.3**	**0.0**	**0.0**	**2.9**	**2.3**
Submarine Transition	0.0	0.0	0.0	3.0	1.2
Surface Ship Transition	0.0	0.0	0.0	2.5	2.0
Total	**0.3**	**1.5**	**1.0**	**8.4**	**5.5**

Friction Stir Processing of Ni Al Bronze Propellers (FSP/NABP) Rapid Technology Transition

Operational Need

- Improve Submarine Propeller Availability
  - Reduce cost
  - Reduce manufacturing and repair time
- Use of conventional fusion weld repairs of new propulsors and propellers requiring refurbishment affects the ability to provide ready-for-issue Ni Al Bronze blades/propellers for timely ship availability.

High PEO Priority
Commitment to Complete Transition

Risk Assessment

- FSP/NABP Technology is Low/Moderate Risk
  - Technical - Feasibility Proven; Certification process and equipment is focus.
    - Special purpose equipment design and construction required. Multiple vendors capable.
    - Business - ROI when fully implemented is 24 to 30 months; Expanded use foreseen at repair facilities.

FSP/NABP Technology

Process – DARPA initiative. Feasibility proven. Rotating tool generates heat which plasticizes surface layer. Microstructure is locally enhanced and any encountered defects are repaired without causing metal to melt.

Programmatics

Transition Target
- PMS450 VIRGINIA Class Propulsor New Construction
- PMS392 Ni Al Bronze Propeller Refurbishment

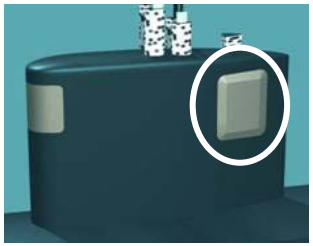
MOA Status - PMS450 MOA Developed and Submitted to CTTO

TASK	Period of Performance	Est. ($K)
1 – Establish Certification Plan	Oct 03 – Dec 03	$75K
2 – Complete Cert Plan Phase I	Dec 03 – Sep 04	$700K
3 – Design, Build, and Install FSP Production Unit	Feb 04 - Apr 05	$1600K
4 – Complete Cert Plan Phase II (PMS450)	Oct 04 – July 05	$350K

Immediate Need is Propulsor New Construction, but Implementation to Existing Surface Ship and Submarine Fleet is Envisioned

PEO IWS LOW COST CONFORMAL ARRAY (LCCA) [#1]

Affordable Situational Awareness



- 2 arrays, 2400 elements/array
- Integrated with ARCI/APB
- High frequency (same as forward looking array)
- Large vertical aperture gives more array gain, enables passive multipath ranging
- Active staves (24 high x 3 wide)

- Folded Tonpilz sensors, processing in array, re-hosting ARCI software - affordable, effective
- Sail placement for ~360º coverage

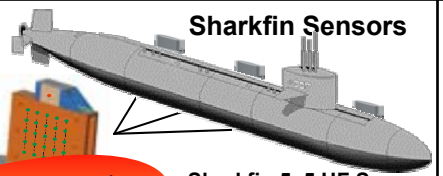
MOA Ready for signature

- **Mission Need:** Submarines are at risk today - Increased Operations in high contact density littoral waters stress current sensors/operators' ability to maintain tactical control
- **Technology Need:** Enhanced situational awareness and close-aboard tactical management
  - Provide 360º continuous sonar and ranging coverage
  - Improved ability to detect threat submarines in littorals where towed array can not be employed
- **Stakeholders:** Requirement - Submarine Type Commanders, Sponsor - N77, Acquisition - Team Submarine (PMS401) & PEO IWS (APBs)
- **System application:** SSN 688s & SSN 688Is funded, SEAWOLFs & VIRGINIAs planned
- **Performing activities:** Array by ARL:UT, processing by LMCO, integration by NUWC
- **Benefits/Payoff**
  - Accelerates submarine risk reduction/tactical control for four ships by one year

Saddlebags

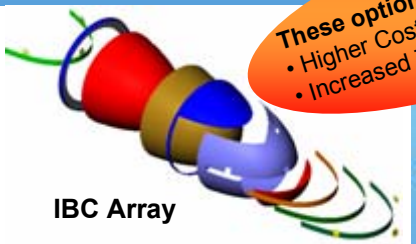
Panels utilize CAVES inner decoupler technology with advanced conformal sensors

Sharkfin Sensors



Sharkfin 5x5 HF Sensors

These options eliminated due to:
- Higher Costs (Dev, Prod & Life Cycle)
- Increased Tech & Sched Risk

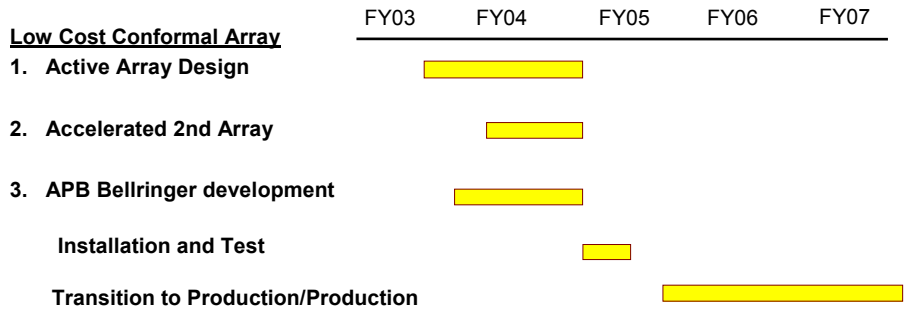


IBC Array

Long Flank Array

Example: 320 x 3 elements, 7.5" spacing, 200' array

- Extends coverage to ~ 340º - 360º (frequency dependent)
- High frequency screens out distant contacts
- Provides ranging out to raypath limit
- Easily installed (no drydock required, use existing penetrations)
- Low risk - RTT reduces risk of getting 4800 sensors of data at 100KHz sample rate in through hull penetrations



ASN Funding Option	0.0	3.0	0.0	0.0	0.0
Active array design	0.0	1.3	0.0	0.0	0.0
Accelerated 2nd array	0.0	1.2	0.0	0.0	0.0
APB Bellringer development	0.0	0.5	0.0	0.0	0.0
Program	**3.2**	**0.0**	**2.0**	**2.0**	**0.0**
Transition/Production (4 ships/	**0.0**	**0.0**	**0.0**	**10.0**	**12.0**
TOTAL	3.2	3.0	2.0	12.0	12.0

AVIATION INFORMATION MANAGEMENT SYSTEM
AVIATION WEAPONS INVENTORY MGT SYSTEM / ELECTRONIC OUIJA BOARD RAPID TECHNOLOGY TRANSITION

Problem

Current aviation data management aboard ships relies on a myriad of manual processes that are unable to provide time critical information to the warfighter

Technology Solution

AIMS is an open systems architecture, real-time solution for aircraft and aviation weapons inventory tracking, planning and management for CVs

- Integrated Data Base
- COTS Display Hardware and Sensors
- Image Recognition Algorithms

Risk/Benefit

- **Technology is Low Risk**
  - Similar system for Air Traffic Control (PriFly, CATCC, Air Ops) is operating aboard 8 Carriers
  - TRLs are all 6 or Better
- **New Operational Capability**
  - Increased Sortie Rate
  - Reduced Total Ownership Cost
- **RTT Accelerates AIMS Program**
  - Provides new capability on ship 2 years early
  - Enables extended ship techeval prior to production in FY06

Summary

- **Programmatics**
  - Funding Required: $1.85M
  - Period of Performance: Dec 03 - Dec 04
  - Deliverable: Prototype system build and shipboard demo (CVN-71 target ship)
- **OPNAV Support is Strong**
  - PEO (CV) #1 RTT Priority
  - 2003 CVN OAG #9 Priority (out of 20)
    - Weapons Group #1, Air Group #4
  - N78, PMA 251 on board
    - (MOA forthcoming)

BUSBARS FOR MARINE POWER DISTRIBUTION

MGC Duresca: 3 single phase solid conductors can handle 13.8 KV and any current capacity in support of DDX and CVN 21 Class designs and projected future weapon and defensive systems

Example: wherever fully or partially integrated electric propulsion creates a need for high density power to be safely distributed in a limited space

- Compact dimensions
- Tight bend radii
- Segment construction possible
- Pre-installation on the blocks
- Reduces weight over cables
- Eliminate 13.8 Kv cable termination failure points

- **Mission Need:** Support of distribution of very high power density to high power loads under a zonal architecture
- **Technology Need:** 13.8 Kv cables can only be routed in single phase cable bundles in 2 or 3 sets to meet ampacity.
- **System Application:** DDX and CVN 21 Class
- **Performing Activity:** NSWCCD and SPD
- **Benefits/Payoff:** Significant reduction in weight and volume compared to cables. Supports modular construction, improved survivability, repairability and damage resilience. Eliminates bend radius limitations and improves fire protection.

Risk Assessment: Low

- Mature COTS with 40+ years land (16+ years marine) experience that requires NAVSEA certification for use in shipbuilding programs

Proposed Tests

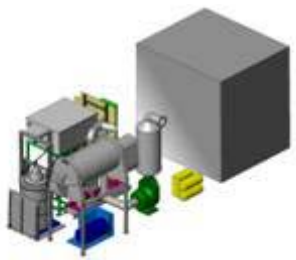
- **Electrical Characteristics** – Conduct tests to determine impact on systems interface (e.g., iInductance, capacitance, EMI,..)
- **Physical Properties** – Conduct tests to establish optimum wireway support (e.g., Incompatible materials, Terminations,…)
- **Construction Compatibility** – Conduct tests to determine issues with installation of bus bar on ships (compare with installation aspects of single conductor medium voltage cable)
- **Environmental** – Conduct tests to ensure bus bars meet required standards. (e.g., vibration, temperature, salt spray, …)
- **Survivability** – Conduct tests to determine resistance of bus bar to casualties (e.g., shock, live ordnance,…)

- Rare opportunity to impact two ship designs with an enabling infrastructure technology
- Risk Mitigation for 13.8 Kv single phase cable
- Total Estimated Cost: $1 M (FY 04)
- Foreign Source Materials
- Full certification by NAVSEA to utilize Duresca by 1 Oct 2004 to support 13.8 Kv Zonal
- Distribution on DDX and specific applications
- on CVN 21 for survivability and weight reductions

CVN ADVANCED SHIPBOARD WASTEWATER TREATMENT

Problem: CVN-21 must comply with current and anticipated environmental discharge regulations in order to maintain mission readiness. New technology that provides high quality discharge effluent with a minimum impact on space and weight and with lower overall operating costs must be identified and transitioned for shipboard use.

Solution: Existing technology developed by WASTECH for the Army and sold commercially will be scaled and adapted to the shipboard environment. This new, compact, modular technology provides advantages over equipment currently used on CVN-77 that translate to space, weight, and cost savings.



Technology:
WASTECH has developed and commercialized a wastewater treatment technology that includes particle extraction as pre- and post-treatment for an aerobic treatment system to increase robustness and reduce space and weight while achieving high quality dischargeable effluent. WASTECH technology also isolates and dries all solids to reduce sludge volume (90%) and generate an easily managed and incinerated by-product.

WASTECH and NGNNS will deliver:

- Adapted technology system design to meet Navy requirements
- Prototype treatment system for pier side testing
- Advanced prototype for at-sea testing
- Design for appropriately scaled system for acquisition

TASK	PERIOD OF PERFORMANCE	FUNDING
Wastewater characterization and Navy requirements documentation	FY04	$125K
Design, build and test pilot scale prototype adapted for shipboard use	FY04	$900K
Prototype system operations and performance testing (in house)	FY04	$250K
Prototype deployment and pier-side testing	FY04	$350K
Design, build and install shipboard system	FY05	$725K
Conduct sea trial	FY05	$350K
Assess and review test results; prepare preliminary design for full-size, platform-specific treatment system	FY05	$750K
	FY04 Total	$1,625K
	FY05 Total	$1,875K

WASTECH / NGNNS / CTTO Program:

- Upgrades existing Navy capability
- Meets CVN-21 requirement for environmental discharge
- Reduces pier-side wastewater handling costs, $1M/deployment
- Reduces equipment weight requirement by 400,000 lbs
- Reduces equipment space requirement by 4,000 ft^3
- Eliminates sludge holding time
- Maintains ship on station – no leave for wastewater discharge
- Provides a scaleable solution for other classes of Navy ships
- Provides cost-effective commercial technology for Navy use

BATTLESPACE PREPARATION AUTONOMOUS VEHICLE (BPAUV)

Battlespace Preparation

Low cost Unmanned Undersea Vehicle planned to be launched/recovered by LCS

Performs following functions:
- Mine Reconnaissance
- Bottom mapping
- Bathymetry
- Hydrographic surveys

17 hour endurance

Program:

Mission Need: Littoral Combat Ship has requirement to employ offboard sensors to conduct mine reconnaissance and minefield/ bottom mapping.

Technology Need: Unmanned undersea vehicle with sidescan sonar and computer aided detection processing capability

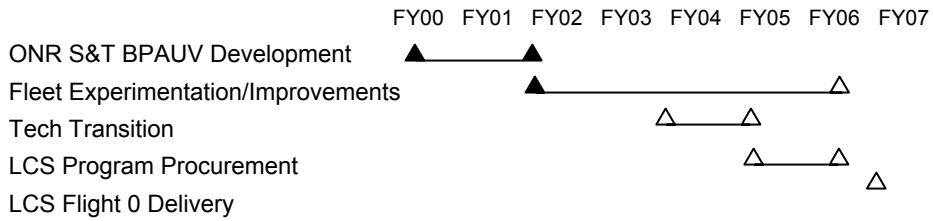
Stakeholders: N75 (Sponsor), PMS501 (LCS PM), PMS420 (LCS Mission Module PM), PMS403 (BPAUV PM), CSS Panama City (TDA), Bluefin Robotics (Contractor)

Application: MCM Mission Module for LCS

Benefits/Payoff: Provides US Navy with cost effective, small scale battlespace preparation/ mine reconnaissance/ bathymetry capability which does not exist today

Alternatives Considered

- Existing systems (UUVs, USVs)
  - Not cost effective for battlespace prep mission or small scale mine reconnaissance missions
- Other commercial UUVs
  - Not tailored for MIW/battlespace prep mission
  - - Significant development cost required to pay for what ONR has already invested in BPAUV
- BPAUV is the best organic MCM system to meet the LCS need.
- Technical risk: Low - BPAUV has been successfully demonstrated during Fleet exercises such as GOMEX, FBE-J



	Funding ($M)					
	FY00	FY01	FY02	FY03	FY04	FY05
ASN Funding				3.5		
LCS Program						5.0
ONR Experimentation	1.4	3.0	0.1	0.5	3.0	

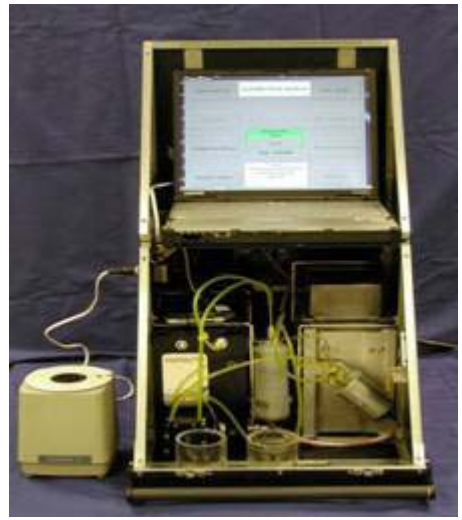
PORTABLE FLUID ANALYZER

Need:
Navy and USMC need a cost effective fluid analysis capability for machinery diagnostics/prognostics to increase operational readiness, while reducing Total Ownership Cost.

Solution:
Provide DRPM (AAA) & PEO (Aircraft Carriers) with state of the art portable fluid analysis capability heretofore unavailable to combat forces.

PFA Technology:

- LaserNet – Debris
- Fluid Scan – Chemistry
- Viscosity Monitor
- Laptop Computer
- Size: 14” X 14” X 24”
- Weight: 80 lbs



Tasks and Funding:

- Transforms PFA prototypes into commercially available instruments: Design for manufacturability.
- Work Efforts:
  - Reduce Unit Footprint and Weight for Portability
  - Optimize Software / Interfaces
  - Ruggedize supportable field units
- Provide DRPM (AAA) / PEO (Aircraft Carriers) with PFA test units for data gathering and hardware / software refinement.

$2.44M / 2 yrs

Impact / Payoff:

- Estimated $14M/year cost savings from reducing catastrophic engine/transmission failures
- Immediate, Actionable information for engine / hydraulic system maintenance requirements (on the spot fluid analysis)
- Reduced unplanned breakdowns / Increased Operational Readiness
- Reduced Life Cycle Support Costs
- Opens door to machinery prognostics
- Applicable to hydraulic fluid and fuel analysis
- No Recurring Instrument Calibration

RTT FUNDING CANDIDATES

Acquisition Community	Title	Description	Funding ($M)
PEO (T)	**AA)** E-2C Garmin	Transponder to enable precision landing and operation in European controlled airspace	0.5
PEO (T)	**BB)** Eddy Current Inspections	Aircraft engine testing equipment to detect microcracking and reduce unneeded overhauls and engine replacements	0.383
PEO (T)	**CC)** F/A 18 Fiber Optic Splicing	Fiber optic cable splicing and testing technology to enable	1.5
PEO (T)	**DD)** E-2C Auto Air Tasking Order / Airspace Control Order (ATO/ACTO)	Automated data entry capability to eliminate manual entry of ATO data	2
PEO (T)	**EE)** F/A 18 Scalable Recorder	Aircraft display recorder to support mission review and training	2.5
PEO (A)	**FF)** Battle Force E-Mail	Aircraft modem to enable transfer of text and imagery	1.55
PEO (A)	**GG)** Increased Bandwidth E-6 Senior Leadership Comm System (SLCS)	Expanded bandwith capability for Senior Leadership aircraft	0.96
PEO (W)	**HH)** Precision Terrain Aided Navigation (PTAN)	High resolution TERCAT gear for Tomahawk to eliminate GPS vulnerability	2
PEO (W)	**II)** SLAM Extended Range	Certification of missile capability against relocatable targets	1.7
PEO (W)	**JJ)** Firescout	Modular mission payload to enable mission reconfiguration	1.1
NAVAIR	**KK)** Electronic Obsolescence Mitigation	Replacement gear to reduce obsolescence in AYK-14 computers	3.5
NAVAIR	**LL)** SCRAM Display Technology	Large format flat panel displays for aircraft	3
PEO Ships	**MM)** Metal Matrix Composite Material	Low-wear material for ship shaft seals to reduce replacement and maintenance costs	0.98
PEO (IWS)	**NN)** Human Alerting & Interruption Logistics - Naval Open Architecture (HAIL-NOA)	Software for operator alerting on Aegis systems	2.5
	OO) Intentionally left blank		
PEO (CV)	**PP)** Optical Current Transducer	Low-cost, small, external sensor to measure current and voltage on power cables	2.4
DRPM (AAA)	**QQ)** Onboard Vehicle Power	Auxiliary power (8kW) for all Marine vehicles	0.7
PEO C4I & Space	**RR)** Bandwidth Optimization	Improved throughput (2x-4x) for afloat units	1
PEO C4I & Space	**SS)** E-2C HF SIPRNET	Airborne C2 platform full TCP/IP, including chat to	1.14
PEO C4I & Space	**TT)** Naval Enterprise Network	Fleetwide visibility into IP/RF networks for increased	1.33
PEO C4I & Space	**UU)** VTC over IP	Recoup dedicated VTC bandwidth for all IP functions	1
PEO C4I & Space	**VV)** Weapons Data Link	High volume density Link-16 unit for all guided munitions	1.7
PEO C4I & Space	**WW)** Assured IP	Ability to LPI comms (IP) in EMCON conditions	2.4
TOTAL:	**RTT (in millions)**		**$35.84**

GARMIN GNS-530 FOR E-2C HAWKEYE PRECISION APPROACH & RNP RNAV CAPABILITY

Transceiver and Antenna not shown

Overview

- Low Cost COTS GPS/VOR/ILS Navigation Unit
- Interim CNS/ATM Solution for Legacy E-2s
  - – Spiral 1 of 2-spiral development plan
- Provides Land Based Precision Approach (ILS)
  - –#2 SSWG and #5 OAG Issue
- Future Growth Potential includes GPS WAAS, TCAS, TAWS and Weather Data Link
- Plan to retrofit entire 75 aircraft fleet

Description

- Built By Garmin, Inc. in Olathe, KS
- 40,000+ GNS-430/530's sold worldwide
- Successful E-2C Aircraft Prototype in VAW-77: Operationally Flown 6 months
- Second E-2C Aircraft Prototype scheduled for Carrier Suitability Testing in Nov '03
- Also in use by USA, USCG helicopters

Cost and Schedule

• NRE		$2.8M
• Recurring	$6.2M	
• Test and Eval		FY04
• Installations	FY05-07	

PMA-231 Requesting $600K for Costs Associated with Test and Eval in FY04

EDDY CURRENT INSPECTIONS

Problem

- Edge of Contact (EOC) cracking has been discovered on high time 1st and 2nd Stage Compressor Spools and 2nd Stage Fan Disks. This cracking has the potential to cause part failure resulting in possible loss of aircraft.
- GEAE recommends that the spools be replaced at 6,000 Total Accumulated Cycles (TAC), rather than the original life of 13,200 TAC.
- This recommendation is logistically unsupportable by the USN.
  - The USN currently has 72 spools that are above 6,000 TAC.
  - By the end of the program an additional 72 spools will reach 6,000 TAC.
  - The cost to replace a 1-2 spool is = $45,600.

Requirement

•The USN requires a reliable inspection technique to detect cracks in the HPC 1-2 spool and the 2nd stage fan disk.

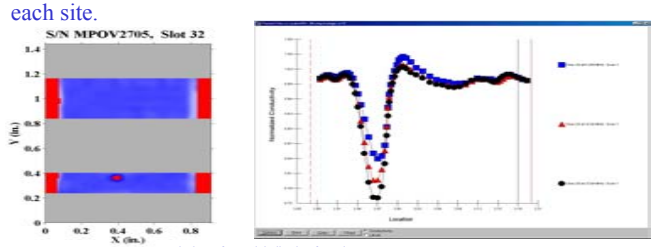
–Capability needs to exist at the Intermediate and Depot level of maintenance.

–The inspection must be able to detect the cracks despite the presence of fretting in the 1-2 spool and the 2nd stage fan disk.

NAVAIR

Technical Solution

- JENTEK Sensors Inc. located in Waltham, MA has developed a new Multi Array Meandering Winding Magnetometer (MWM) Eddy Current inspection.
  - Capable of filtering noise from fretting
  - Balloon technology conforms to slot geometry to reduce lift-off and probe wear
- Proof of Concept has already been accomplished in the laboratory.
  - SBIR Contract # N68335-00-D-0463
- Need to prove capability in the field at I and D-level
- If the inspection works at I and D-level, a system will be purchased for each site.



Displays of a crack indication from the JENTEK system

NAVAIR

Cost to Implement Inspection

I-Level
- Portable Test System (includes a 1-2 Spool probe)
  - $110,000
- Development of Probes
  - 1-2 Spool and Stage 2 Fan Disk $62,000
- 2nd Stage Fan Disk Probe
  - $17,500

Depot Level
- Portable Test System (includes a 1-2 Spool Probe)
  - $110,000
- 2nd Stage Fan Disk Probe
  - $17,500
- Semi-automated Inspection Stand
  - $22,000
- Limited Technical Support
  - $12,000/year *
- Validation/Performance Evaluation Support
  - $32,000

Total Cost of Implementation
$371,000 *

* Cost total does not include $12,000/year limited technical support

Return on Investment

•ROI ? $4,000,000

–$371,000 to Implement the Inspection at AIMD Oceana and Tinker Air Force Base

–144 spools are expected to reach the 6,000 TAC life

–Current inspection reject rate is 33%

–144*67% = 96

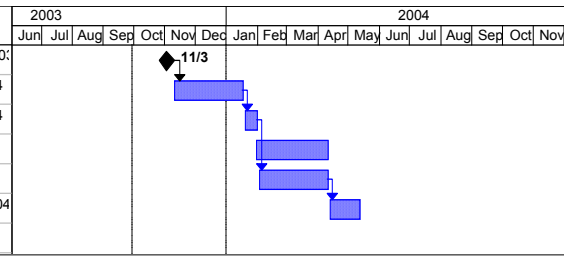
–96 * $45,200 ? $4,380,000

–$4,380,000 - $371,000 ? $4,000,000

NAVAIR

Schedule

ID	Task Name	Start	Finish
1	Receipt of Funds	Mon 11/3/03	Mon 11/3/0
2	JENTEK Design of Prototype	Mon 11/10/03	Fri 1/16/04
3	Field Test Prototype	Mon 1/19/04	Fri 1/30/04
4	Tech Manual/Data Updates	Fri 1/30/04	Fri 4/9/04
5	Procure JENTEK Inspection S	Mon 2/2/04	Fri 4/9/04
6	Fleet Implementation 2 sites	Mon 4/12/04	Tue 5/11/04



NAVAIR

F/A 18 FIBER OPTIC SPLICING

- FIBER OPTIC TECHNOLOGY AND INSERTION IN NAVAIR AIRCRAFT REQUIRE SUPPORTING FIBER-OPTIC MAINTENANCE PROCEDURES, COMPONENT AND EQUIPMENT
- PMA-265 WILL DEVELOP AND INTEGRATE FIBER OPTIC TECHNOLOGY TO PROVIDE FOR HIGH SPEED DATA/VIDEO NETWORK FOR F/A-18 E/F AND E-18G.
- PMA-265 NEEDS BRIDGE MONEY TO COUPLE FIBER-OPTICS MAINTENANCE SUPPORT WITH THE ACCELERATION OF FIBER-OPTICS IN NAVAIR AIRCRAFT A UAVs.
- THIS REQUEST PROVIDES FOR BASIC COMPONENTS TO SUPPORT ROUTINE MAINTENANCE; PROVIDE FOR FAULT ISOLATION WRT TO FIBER-OPTIC SYSTEM.

MISSION NEED:

- USN MAINTENANCE PROCEDURES/EQUIPMENT MARGINALLY CAPABLE OF MEETING ROUTINE MAINTENANCE NEEDS OF FIBER OPTIC SYSTEMS AND COMPONENTS IN AIRCRAFT

TECHNOLOGY NEED:

- BUILT IN TEST CAPABILITY FOR THE WRA/FIBER-OPTIC "SYSTEM" ENVIRONMENT
- CURRENT FIBER-OPTIC TRANSCEIVERS LACK SUFFICIENT DYNAMIC RANGE
- USN LACKS ADEQUATE AND FIBER-OPTIC SPLICING CAPABILITY

STAKEHOLDERS: NAVAIR, ONR AND DEFENSE SUPPLY SUPPORT CENTER CLEVELAND

BENEFITS/IMPACT:

- GREATER AIRCRAFT OPERATIONAL AVAILABILITY AND FIBER-OPTIC AIRCRAFT ENTER FLEET
- PROVIDES FAULT DETECTION AND ISOLATION CAPABILITY
- FACILITATES AND ACCELERATES INDUCTION OF FUTURE MORE COMPLEX FIBER-OPTIC SYSTEMS INTO E-18G

-

COST SAVINGS ON F-18 ALONE OVER $30M

TECHNOLOGY:

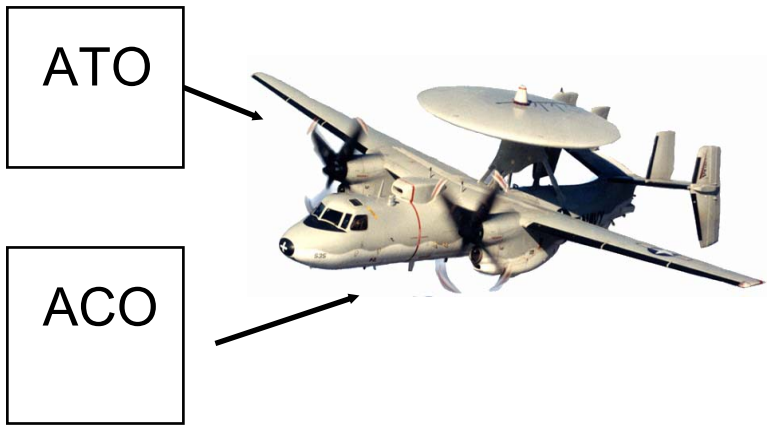
- 1.3uM VCSEL TRANSCEIVER OPTICS AND AVALANCHE PHOTODIODES AVAILABLE IN COMMERCIAL SECTOR
- OPTO-ELECTRONICS BUILT IN TEST (OBIT) TECHNOLOGY PROVIDED UNDER SBIR
- FIBER-OPTIC SPLICING TECHNOLOGY READILY AVAILABLE IN COMMERCIAL SECTOR

RTT

FUNDS USED TO RUGGEDIZE AND CERTIFY FOR MILITARY USE

	FY04	FY05
ASSESSMENT AND SELECTION OF COTS	100K	
COMPONENT TESTING	500K	200K
RETROFIT WRA TRANSCEIVERS	200K	500K
TOTAL	800K	700K

AUTOMATED ATO/ACO FOR E-2C



Mission Need:

- Paper-based method used currently adversely affects E-2C execution of Airborne Battlefield Command and Control
- E-2C is an intense workload environment

Technology Need:

Need a tool to bring the ATO/ACO onboard the aircraft electronically and dynamically correlate the information to local active tracks.

Technology Benefits

- Automatic ID of blue forces – fratricide prevention
- Target to weapon pairing supports time critical strike
- Better Tanker Coordination

Technology Solution

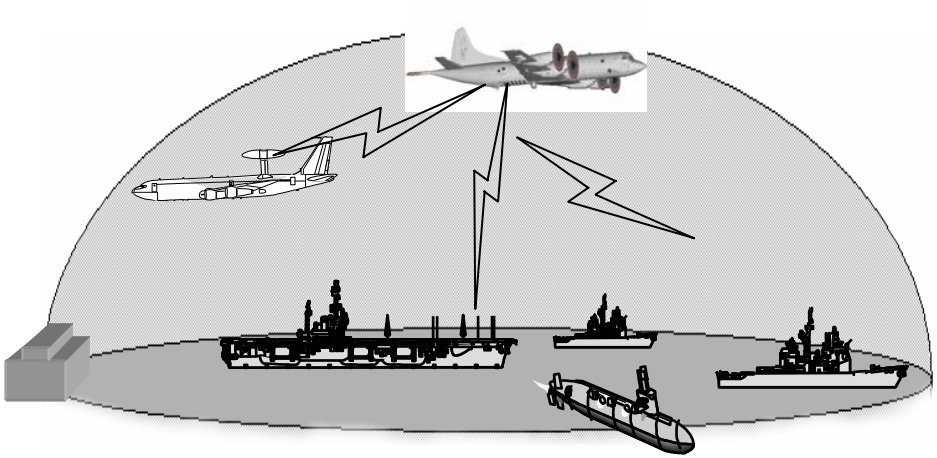
Lockheed Martin software parses ATO/ACO messages and has built-in correlation algorithms to match IFF codes from local active tracks to ATO missions. AODS program is working to integrate LM software however additional funding is required to implement the ACO functionality, i.e. airspace de-confliction, display of hazard zones, etc.

	FY04	FY05	FY06	FY07
AODS Phase I T&E	$2M	(PMA dollars)		
AODS Phase II Development	$1.6M	Requested funding		
Phase II T&E				
Fleet Release	◇			◇

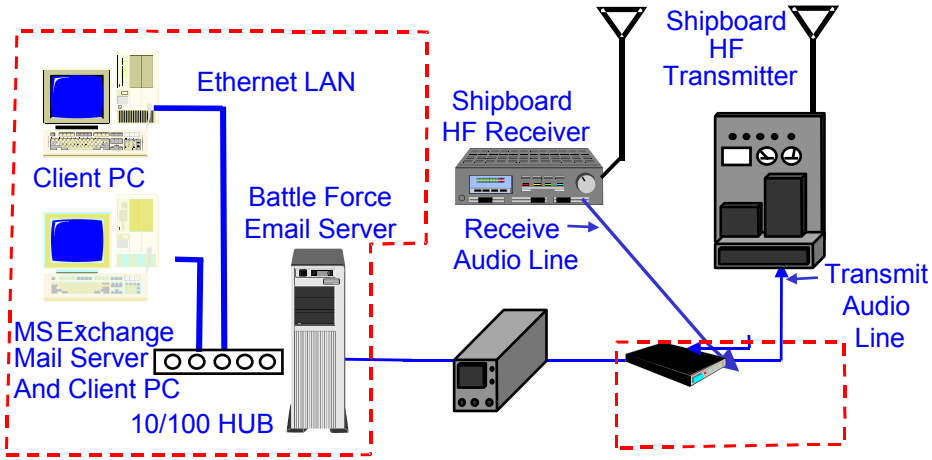
Contact Information

LCDR Dean Wilson (301)757-2307
Amy Burroughs (301)342-9123

BATTLE FORCE EMAIL (BF-EM)



- **Mission Need:** Lessons Learned from Operation Iraqi Freedom highlighted the need for the P-3C AIP aircraft to provide additional over-the-horizon (OTH) communications capability in order to participate in emerging Intra Battle Group / Amphibious Ready Group Network Centric nets
- **Technology Need:** Integration of Rockwell modem into OASIS
- **Benefit/Payoff:**
  - EB-EM is a HF communications capability, which allows AIP Aircraft to transmit ISR images to coalition forces
  - Allows AIP to integrate ISR data with NATO Allies



Integration of the BF-EM modem into the AIP HF communications system and to add (software and hardware) into the OASIS tactical data processor		
Contract Award	2nd Qtr FY04	
•Integrate software into OASIS system		$400K
•Design the wiring interface internal to the OASIS TDP		$100K
•Design the wiring external to the OASIS TDP		$100K
•Design the drawing & documentation package for the mod		$100K
Complete	3rd Qtr FY04	
Integrate into PHIC Lab	4th Qtr FY04	$125K
Integrate into the test aircraft	4th Qtr FY04	$125K
Fully test the system		
•Lab Tests	1st Qtr FY05	$150K
•Aircraft Ground tests	1st Qtr FY05	$150K
•Aircraft flight test	1st Qtr FY05	$200K
Generate the operation & maintenance documentation package.	2nd Qtr FY05	$100K
Total		**$1,550K**
Tech Insertion: Critical Obsolesence Program (COP) will provide new HF radios with an embedded modem beginning in FY04.		

E-6 RTT PROPOSAL

Requirement

- **OASD Memorandum to COMSTRAT,** *Inclusion of the E-6 in the Senior Leadership Communications System (SLCS) Mission Area Plan (MAP) for Executive Aircraft*, **dtd January 9, 2003**
  - **E-6 designated as a member of SLCS**
- **OSD C3I Memorandum,** *SLCS Wideband Information Systems Aircraft Requirements (Updated)* **dtd 07 Jan 2002**
  - **Provide senior leaders/staff with uninterrupted, seamless, and interoperable connectivity**
  - **Decision making during crisis situations requires real time situational awareness supported by full duplex broadband communications**
- **STRATCOM Airborne Command Post (ABNCP) Tasking**
  - **Airborne Emergency Action Officers (AEAO) require critical intelligence, SIOP database traffic, large meteorological metafiles/fallout diagrams, and battlestaff desktop access to multiple STRATCOM secret and unclass data sources supported by broadband comms**
- **Bottom Line**.....**Immediate Need for Full Duplex Broadband Comm to Support SLCS and STRATCOM Tasking**
  - **Normal POM/PR/Acquisition processes unable to support quick response**
  - **RTT Program offers tailor made solution utilizing recent technology insertion program successes**

Technical Solution

- NORTHSTAR Version 2.0 GEP Network Digital Upgrade
  - **Northstar supports High-Profile Missions : National Airborne Operations Center (NAOC), the STRATCOM ABNCP (E-6), Air Force One/Two, and special mission A/C**
  - **22 GEPs provide air-to-ground coverage over CONUS**
  - **Connected to T-1s landlines to Gov't Operation Centers**
- AT&T Tech Insertion Demo on NAOC in Feb 04
  - **Addition of digital capability to ground infrastructure and airborne platforms**
  - **Full duplex IP data services to 784 Kbps using COTS equipment integrated with A/C systems**
- Cost Effective Solution to New Requirement
  - **Sat based WB solutions (INMARSAT, Connexions by Boeing) provide less BW at higher cost**
  - **Digital GEP aircraft prototype is $960K vs satellite systems at $3-4M**
  - **GEP acquisition hardware/software via existing leasing arrangement w/ AT&T through AFPCA at $60K annually for 16 aircraft (O&MN funded)**
  - **Sat based systems acquisition costs approx $30M w/ additional sat time charges**

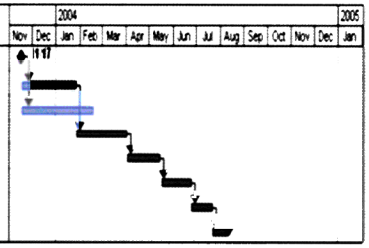
Mission Impacts

- Why It's a Great Idea...
  - Digital GEP Tech Insertion meets SLCS/STRATCOM requirements at fraction of cost of alternative systems
  - Fields capability to meet emergent requirement much earlier (FY05) than through conventional acquisition processes
  - E-6 integration/test/operations directly support SLCS/STRATCOM CONOPS development and installation on other special msn A/C
  - Field modification for fleet A/C during Phase Maintenance cycle
- But If Not Supported...
  - Current E-6 capability limited to 2.4 Kbps reachback
  - E-6 will be unable to support senior leaders C3 requirements in 9/11 and/or Global Strike type scenarios
  - Funding will be pursued through normal POM/PR process, most likely POM 06 issue with implementation in FY08

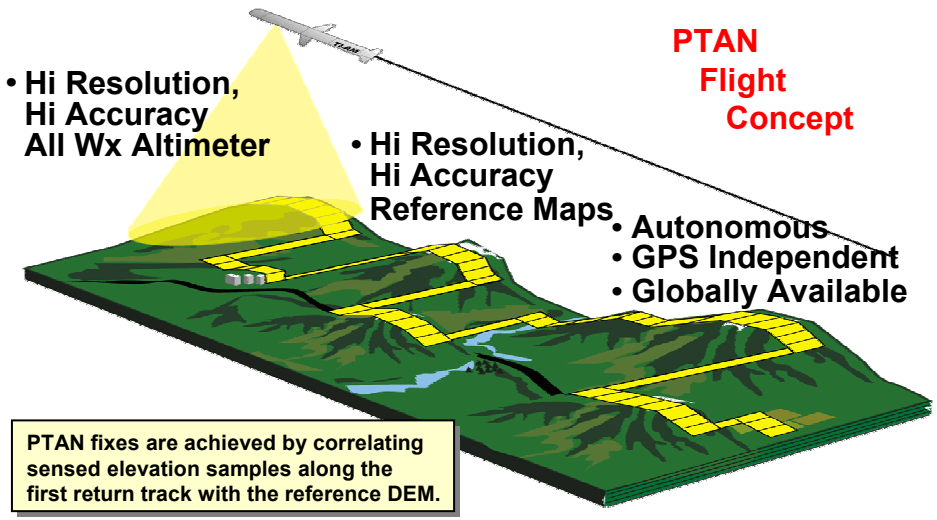
Spend Plan

- Funding Required - $960K
  - Support prototype design, integration/installation and test into E-6B
- Acquisition Hardware/Software to be Acquired via Existing AFPCA Contract with AT&T
  - Lease for hardware/software approx $60K for all 16 E-6 aircraft to be funded annually by O&MN
  - O&MN to fund aircraft integration (cables, rack changes, labor)

ID	Task Name	Cost	Start	Finish
1	Receipt of Funding	---	Mon 11/17/03	Mon 11/17/03
2	Procure/Lease Hardware and Software	$50K	Tue 11/18/03	Mon 1/26/04
3	Design Integration Kit for STRATCOM and E-6	$320K	Tue 11/18/03	Tue 2/17/04
4	Fabricate Integration Kits	$40K	Tue 1/27/04	Thu 4/1/04
5	Install/Test in SL and at STRATCOM	$150K	Fri 4/2/04	Fri 5/14/04
6	Install and Ground Test in A/C	$100K	Mon 5/17/04	Thu 6/24/04
7	Flight Test	$300K	Fri 6/25/04	Wed 7/21/04
8	Draft/Deliver RTT Report	---	Thu 7/22/04	Wed 8/11/04



PRECISION TERRAIN-AIDED NAVIGATION (PTAN)



- **Mission Need:** GPS jamming can degrade navigation accuracy of both platforms and PGMs, resulting in decreased weapon performance and increased collateral damage
- **Technology Need:** Non-GPS dependent Navigation System
- **Systems Application:** Tomahawk
- **Benefits/Payoff:**
  - –PTAN RTT accelerates PTAN SDD from 3 to 2 years allowing 489 additional tactical Tomahawks to be equipped with PTAN
  - –Increases accuracy
  - –Allows SDD to be completed in time to effect tactical tomahawk production in FY08

PTAN TECHNOLOGY

Sensor

- 2ND generation prototype compete and flight tested in aircraft

Data

- All required elevation data (SRTM and DPPDB), as well as data extraction/formatting capability exists and is available today

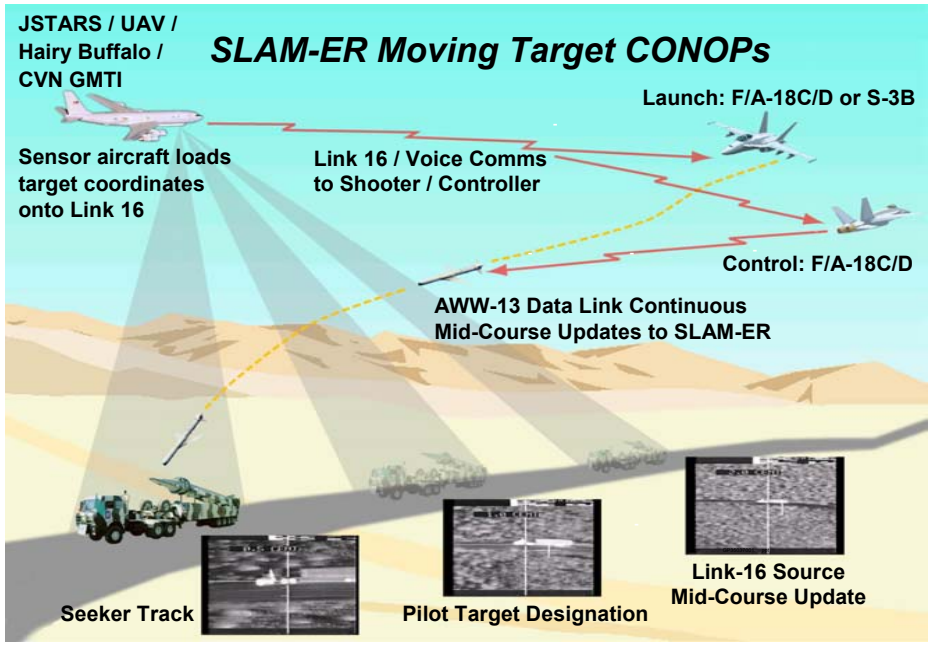
Correlation Algorithms

- Basic algorithms (TERCOM) used for cruise missile (ALCM and Tomahawk) guidance and navigation today

PTAN RTT OVERVIEW

TASK	Period of Performance	Est ($K)
1 - Build two PTAN Prototypes	Dec 03-Sep 04	$850K
2 - Integrate Prototype Into Raytheon System Integration Lab	Dec 03-May 05	$1150K

SLAM ER -- DEFEAT MOVING TARGETS AT LONG RANGE



The Requirement

- **Operational Deficiency:** Inability to strike land moving targets from standoff ranges
- **SLAM-ER ORD :** "Mobile, High Value Land Targets, i.e. Surface to Air Missiles and Weapons of Mass Destruction are objective targets"
- **Sea Strike MCP Capability:** Time-Sensitive Strike
- **Gap:** Inability to strike mobile land targets beyond line of sight
- **Solution:** Defeat moving targets at long range with SLAM-ER
- **Impact if Not Funded:** U.S. Forces will continue to be incapable of prosecuting high-value land moving targets beyond direct attack ranges

"…requires forces that can strike with precision at fixed and mobile targets throughout the depth of an adversary's territory…"
"Quadrennial Defense Review"
30 September 2001

Acquire mobile targets more quickly and "deliver an increasing persistent and decisive volume of timely fire."

First of Nine Transformational Goals of:
"Naval Power 21, A Naval Vision"

Funding

- **Land-Based Moving Target DT/OT**
  - Engineering Support $115K
  - Captive Carry (6 Ops-Performance Validation) $430K
  - Captive Carry (3 Ops-CONOPS Development) $180K
  - Free Flight Launch (3 Operations + 1 Backup) $430K
  - Subtotal $1155K
- **Land-Based Moving Target OT**
  - Captive Carry (5 Ops-Performance Verification) $360K
  - Captive Carry (6 Ops*-CONOPS Verification) $100K
  - Free Flight Moving Target Support $35K
  - Subtotal $495K
  - Total $1650K

Total Requested (ASN Funding) **$1700K**

* -Off range

Technical Approach

Moving Target Capability

- **Land-Based Moving Target S/W Development**
  - Missile S/W already being developed (SSV -1.9.3) with F/A-18 SCS 19C
  - Missile S/W testing funded through FY04 (Complete DT)
  - Technology demonstrated via Captive Carry Flight flown 16 Jan 03
  - Transition missile S/W to operational capability
  - Update & Test A/C S/W
    - Direct development of F/A -18 OFP with 19C auto -update functionality
    - MIDS Link-16 architecture required
  - Combined DT/OT and OT test phase with planned 19C OT
    - Four Shots
    - Collaboration with PMA -281 for Sensor / GMTI tracks planned
- **IOC with F/A-18 SCS 19C**
  - Oct FY05

ELECTRONIC OBSOLESCENCE MITIGATION

Mission Need:

- Mission critical multiple platform mission computing and signal processing requirements are met by legacy equipment (AYK-14 Mission Computer, APG-73 Radar) that contain obsolete components.
- Drop in cards and supporting systems need to be designed and integrated to mitigate growing obsolescence problem.

Technology Need:

- Two technologies have been identified to address this problem; Field Programmable Gate Array (FPGA) and ASIC cell toolsets.
- Systems Application: AYK-14, APG-73 and many others
- Need to develop and execute a low cost certification and integration process for FPGAs as a means to mitigate obsolescence. AYK-14 would be one of many systems applicable to this process.

Benefits/Payoff:

FPGA -

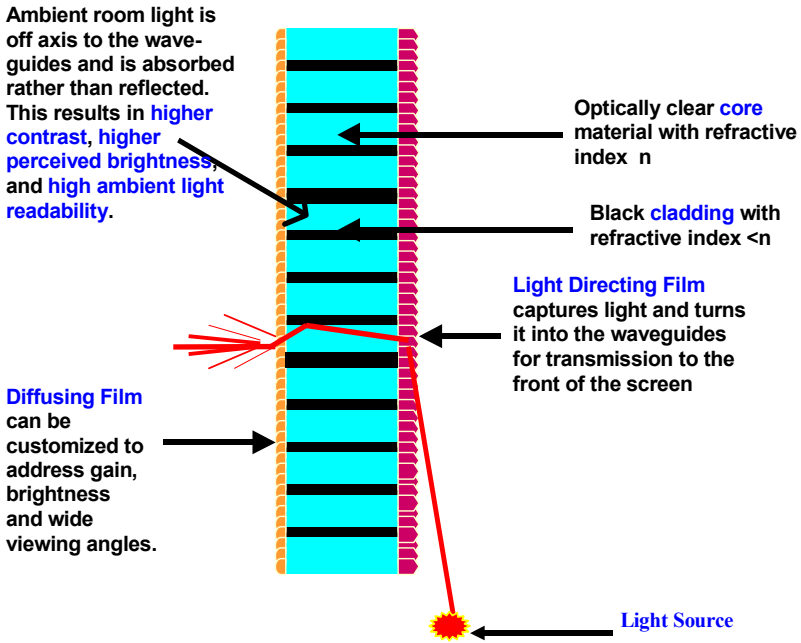
- FPGA approach allows cost avoidance across multiple platforms > $100M for AYK-14 users alone. Allows continued use of viable system. Prevents expensive replacement due to obsolescence.
- FPGA programmability makes design changes low cost
- Multiple SRAs can be replaced by a single FPGA based SRA. Fewer different fleet items to support for the life cycle.
- Low cost alternative to ASICS for many applications.

Technology

- FPGA – Develop and execute standard FPGA based SRA certification process through cooperative CPU Tech (Behavioral Verification Technology), General Dynamics Advanced Information Systems (AYK-14 integration and validation) and NAVAIR PMA-209 AYK-14 IPT (Process development)
- ASIC – Recreate original tool sets and create macro cell library
- Develop cell characterization
- Create guidelines to fill technology gap

TASK	Sched	Cost
Develop FPGA certification process	3 months	$200K
Certify AYK-14 FPGA Based SRA	3 months	$300K
Construct Cell Library	6 months	$2M
System Integration and Validation	3 months	$250K
Fleet Acceptance	3 months	$750K

SCRAMSCREEN VIDEO DISPLAYS



Mission Need:

- Increased commonality between display sizes throughout entire Navy and Marine Corps aircraft inventory.
- Improved image quality required to match the improving video quality provided by current and future sensors (radar, EO/IR, acoustics, intelligence).
- Improved situational awareness through improved optical performance.

Technology Need:

- Improved optical performance through enhanced brightness, contrast, viewing angle, day/night readability and low reflection characteristics.

Stakeholders: ONR, PEO (A), PEO (W), PEO(T), AIR-1.0

System Application: All military platforms requiring a display, ForceNET, Common Avionics Display, AMC&D, CNS/ATM

Performing Activity & Process Implementation Site: NAVAIRSYSCOM PMA-209

Benefits / Payoff:

- SCRAMscreen provides next-generation display technology while improving optical performance through improved contrast and brightness, excellent sunlight readability, and low reflection characteristics.
- Reducing size, weight, power, and cooling requirements and increasing reliability.

Technology:

The SCRAMscreen™ is an advanced screen technology that combines much higher light transmission than conventional screens, with properties that maximize readability in bright ambient conditions. This increased efficiency will allow rear projection displays to use alternative illumination sources such as super-bright LED's. In addition, the optics designed to work with the SCRAMscreen™ allow displays to be produced with a much thinner depth.

This system will be composed of the following components: (1) a digital light engine utilizing the most advanced imaging chip technology available (e.g. DLP™ digital micromirror, liquid crystal on silicon, LCD, etc.), (2) an illumination system that utilizes super-bright LEDs, (3) a projection optics design that has common elements across several display sizes, and (4) a high-contrast, high-efficiency screen that provides outstanding performance.

Current military display designs are typically based on CRT (cathode ray tube) or LCD (liquid crystal display) technologies. These designs have various diagonal sizes which cause a very large number of different models. Maintaining a continuous supply of display units for each platform over decades of service life has created a logistics nightmare. Compounding the issue is the reluctance for technology companies to support the military with new technology that can replace the old technology when the typical military procurement is orders of magnitude less than a commercial sale.

Weapon System Tasks:

Engineering Design Study	Jan 04 - Mar 04	$260K
System Design	Mar 04 - Aug 04	$1,515K
System Prototyping	Jul 04 - Dec 04	$725K
System Performance Testing	Dec 04	$60K
		$2,500K

METAL MATRIX COMPOSITE (MMC) MX-9 SEAL

Need:
The Navy is moving to a 12 year overhaul cycle. Current propulsion shaft seals have an expected life of 3-4 years.

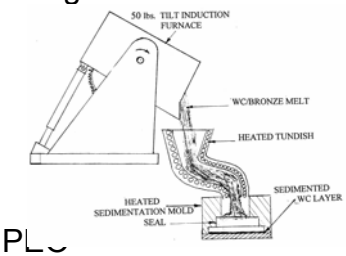
Solution:
Metal Matrix Composite substituted for existing seal materials can substantially increase propulsion shaft seal operational life.

Technology:
Using gravity-induced sedimentary processes, longer wearing metallic particles can be layered in molten metal matrices (like Bronze). The result is a hard , dense layer of controllable thickness, and distribution embedded permanently in a molded part that will not peel, chip, crack, or spall.

RTT will:
- Fabricate 23.5" shaft seals for testing
- Conduct land based (@ OEM) pPerformance test
- Conduct shipboard performance testing (2000 hours)
- Conduct NAVSEA certification testing (shock, vibration)_
- Analyze test data

TASK	PERIOD of PERF	FUNDING
	FY04	$707K
Fabrication of test shafts		
Performance testing		
Shipboard tests		
Foundry source qualified		
	FY05	$277K
Shipboard tests (con't)		
NAVSEA certification testing		
Analysis of Data		
Total Funding		**$984K**

MMC Benefits:
- Longer shaft seal life (3 to 4 X)
- Life cycle cost reduction
- Advances operational concept of Sea Basing
- Reduction of logistical stockpile ashore
- Longer wear in littoral applications



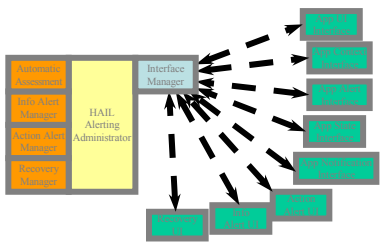
Transition Plan:
MMC shaft seals will be placed on two SURFLANT Ships for long term testing. PLC Ships will roll out MMC technology via Post Shipbuilding Acceptance of constructed ships in FY05, FY06

PEO IWS HUMAN ALERTING AND INTERRUPTION LOGISTICS – NAVAL OPEN ARCHITECTURE (HAIL-NOA) [#2]

Reusable Alert Mediation for Improved Warfighter C2 Decision-Making Capability

HAIL Engine

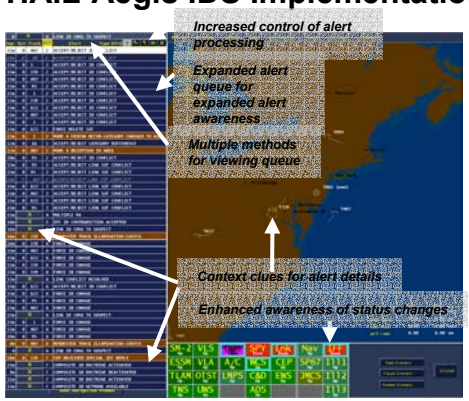
Platform-independent alert mediation engine



Currently at TRL-6

MOA Draft, Signatures arranged

HAIL-Aegis IDS Implementation



- **Mission Need:** C2 operators need the tools to make quality and timely decisions. Technology is required to mediate between alert generation and alert presentation so that operators can handle the overwhelming number of alerts.
- **Technology Need:** Apply FNC KSA HAIL IDS submode technology to all operator positions and conform to NOA standards for applicability to current and future warfare systems
- **Stakeholders:** PEO-IWS, N766, COMNAVSURFLANT
- **Team:** Lockheed Martin Advanced Technology Laboratories, LM MS2 Moorestown, CSC, BCI, NRL
- **System Applications:** AEGIS DDGs and CGs, SSDS planned, DD(X) potential
- **Benefits/Payoff**:
  - Freq. of alerts reduced 50-80%; Time and effort for alert work reduced 15-50%; Time and effort required to associate alerts with tracks on the TACSIT improved 40-60%
  - One time cost $2.5M for all platforms vice higher cost/per platform

Options

With HAIL-NOA

Satisfy Requirement for Increased Warfighter Performance for Alerting

- Effectively control alert stream
- Effectively maintain situational awareness
- Effectively switch between multitasks

(Freq. of alerts reduced 50-80%; Time and effort for alert work reduced 15-50%; Time and effort required to associate alerts with tracks on the TACSIT improved 40-60%)

Satisfies requirement for Reusable Technology (NOA)

Costs: $2.5M total all platforms

Without HAIL

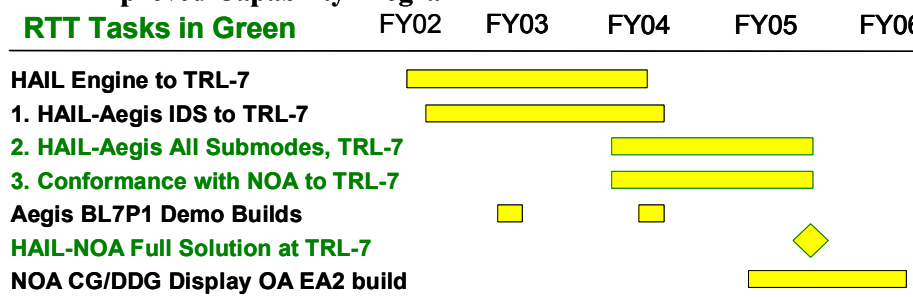
Performance not sufficient to support "Full Mission Capability" of platform

- Operator overload causes decrement in decision quality and increase of errors
- No control of alert stream
- Failure of situation Awareness
- Too many interruptions
- Increase in errors from context switching confusions

Technology not reusable

- **Costs: $5-7M NRE per platform**

HAIL Improved Capability Program



	2002	2003	2004	2005	2006
KSA FNC Program	1.0	2.0	0.4		
RTT Funding			2.0	0.5	
CG/DDG Display OA*				2.0	5.0
Total Funding	1.0	2.0	2.6	2.3	5.0

* Included in PMS 400 POM 06

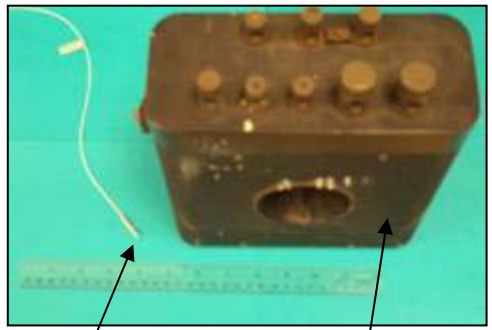
FIBER OPTIC VOLTAGE & CURRENT SENSORS FOR DD(X)/CVN21

Problem

- New Shipboard Features Require Automation of Electric Plant Beyond that of Any Naval Ship
- Existing Sensors Will Cause Significant Growth In Switchboard and Load Center Volume & Weight
- Weight & Volume Reduction is High Priority for PEO Carriers and DDX

IMPACT: Fiber optic sensors will reduce the volume and weight of planned sensor designs by 98%, while providing safety to personnel and equipment.

3,000 Amp Comparison



Fiber Optic Sensor

Conventional Sensor

Optical Sensor Technology

- Small Size/Weight
- Explosion Proof/Safe
- Sensor Footprint Constant
- Foundation of Conditioned-Based Maintenance

Risk Assessment

- **Business Risk**: LOW. Team members have deep and significant experience with MIL-SPEC, DoD, and Navy programs
- **Technical Risk**: LOW. Sensor has been developed and tested for commercial applications under USDoE SBIR funding; Sensor is 2003 R&D100 Award Winner
- **Overall Risk**: LOW.

CNO's 1% Program Directly Benefits Effort by:

- **Accelerating MIL-SPEC Hardening & Qualification, Reducing Future Costs of Design/Integration into DD(X), CVN21, and Legacy Electrical Power Systems**
- **Accelerates Development of Conditioned Based Maintenance Systems to Reduce Cost of Maintenance and Operations of Installed Equipment**

Summary

- Sensor Technology has Strong PEO Carrier and DD(X) Support
- Significant, Measurable Impact Is Anticipated
- NAVSEA, PEO Carriers, DD(X), and NSWCCD MOA Approved OCT 03

CNO 1% Funding Requirements

TASK	Period of Performance	($M)
1 – Build & Cert MIL-SPEC Current Sensor System	NOV 03-OCT 04	$1.4M
2 – Build & Cert MIL-SPEC Voltage Sensor System	JUL 04-APR 05	$1.0M

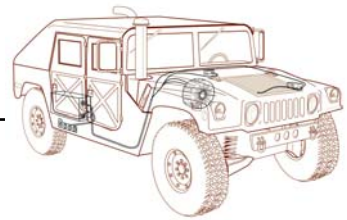
ON-BOARD VEHICLE POWER

Problem:
Insufficient power on the battlefield that is adequate for mission equipment and users, but still mobile enough to not impede maneuver forces. Current mobile electric power is low power man-portable generators, or trailer mounted larger generators. Trailers take up embarkation space on ships, and reduce mobility of HMMWV that is pulling.

Solution:
On-Board Vehicle Power systems that are mounted under the hood power systems are available that can address numerous mission equipment needs.

Technology:
Commercial solutions exist in market place that can provide electrical power from an engine mounted alternator (AC power output) or generator (DC power output)

RTT Funds will deliver:
- 5-8 kW of electric power (dependent on model)
- AC, DC, or AC & DC output
- Bolt on, in-field installation
- 120 VAC, 60 HZ or 28 VDC output
- Full vehicle performance not impacted



Tasks/Funding Profile:

User assessment	2Q-04 – 1Q-05	ONR 6.2 $$
Procure Test Units	2Q-04	$100K*
Qualification Tests	2Q-04 – 3Q-04	$400K*
Test Reports	3Q-04	$ 40K*
Down Selection	3Q-04 – 3Q-04	- 0 -
Durability Test (1)	3Q-04 – 4Q-04	$100K*
Safe / Ready Report	4Q-04	$ 35K*
FRP Decision	4Q-04	- 0 -
First Lot Buy	1Q-05	- 0 –

* = RTT funding Request

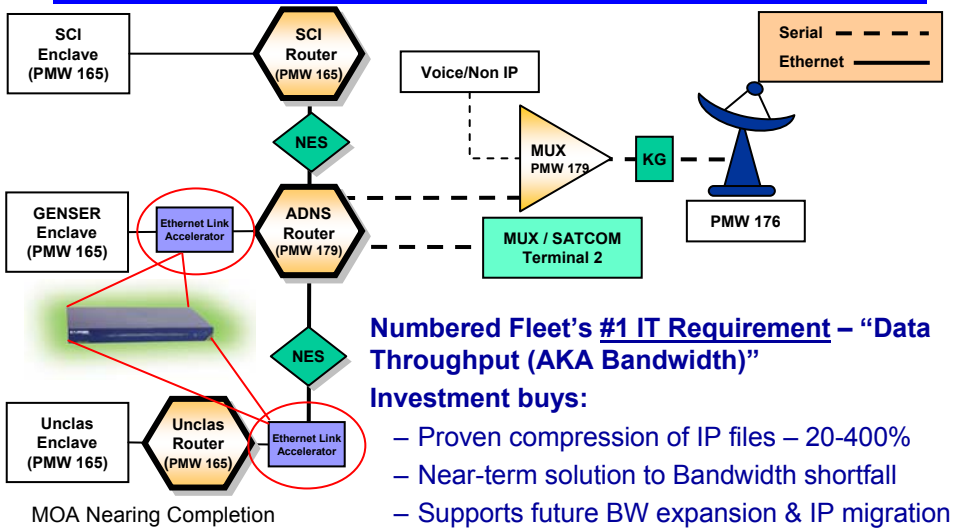
Benefits:
- Fieldable source of power
- Embedded vehicle power source (no towing)
- No Embarkation footprint

Transition:

Current requirements being validated address approximately 5-10% of the USMC HMMWV fleet receiving OBVPS, for an acquisition objective of approximately 1000-2000 systems. The system would be procured under the family of Alternative Power Sources for Communication Equipment program. The $10M - $20M envisioned buy of systems would be spread across 4-6 years.

PEO-C4I & SPACE BANDWIDTH OPTIMIZATION [#3]

Affordably Optimizing Available Bandwidth



MOA Nearing Completion

Numbered Fleet's #1 IT Requirement – "Data Throughput (AKA Bandwidth)"

Investment buys:

- Proven compression of IP files – 20-400%
- Near-term solution to Bandwidth shortfall
- Supports future BW expansion & IP migration

- **Mission Need:** FORCEnet communication and networking requirements calling for "…constant (24/7) worldwide data throughput (50 Mbps for large deck ships, 25 Mbps for all others)".
- **Technology Need:** Expedite introduction & fielding of Bandwidth Optimization technology via spiral development & Fleet demos
- **Stakeholders:** N61, PEO C41& Space (PMW-165 & 179), CFFC; C2/3F
- **System Application:** ISNS (Networks Afloat and at NOCs)
- **Performing Activity & Process Implementation Sites:** Expand Networks, PEO C4I &Space
- **Benefits/Payoff:**
  - Double current throughput capacity without incurring doubling of current recurring costs (INMARSAT ~$34M/year)
  - Low risk to Network –If it fails, it will go into bypass or can be powered off
  - Complements other "Intelligent Bandwidth Optimization" technology (bandwidth management and web caching)

Options

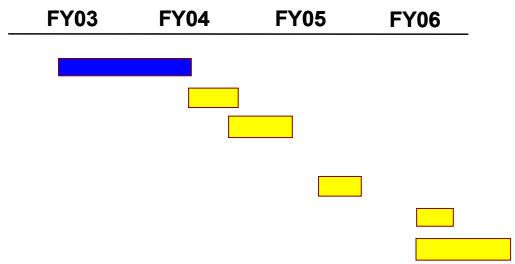
Alternatives Considered	Cost	Integration	Time to Mature/Depoy	Relative BW Expansion
More Satellites				Greater
"Wartime" BW Expansion				Similar to Greater
QoS Routing & IP migration				Similar
B/W Optimization Technologies				Similar
Expand Acelerator**				N/A

- ONR Tech Solutions funded successful completion of lab testing in July 2003 (TRL 6/7) – Ready for At-Sea Demonstration
- Holds 87% Commercial Market share for similar products
- Prior demonstrations validated performance claims
  - •JEMPRS-NT in August 2001
  - •SSC St Julians Creek in June 2001

**Modifications wrt Naval Afloat Tech Arch incorporated into commercial build

Expand Accelerator Program

1. **Spiral 1 Lab Testing**
2. **PACFLT Demo**
   - **Spiral 2 Testing**
3. **Incorporate to ISNS Program**
   - **Non-Recurring Engineering**
   - **Field to NOCs**
   - **Field to Remaining INMARSAT platforms**

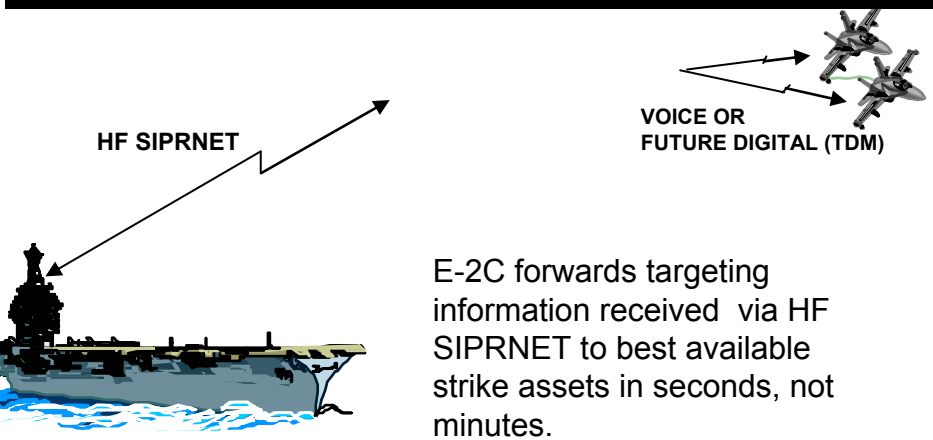


	FY03	FY04	FY05	FY06
RTT		$899K		
ONR Tech Solutions	$360K			
?????			~$250K	
ISNS Program Funds				$57*/Pltfm
Total	$360K	$899K	~$250K	~$8,300K

•Planned POM

E-2C HF SIPRNET -- PEO C4I & Space [#2]

IP CONNECTIVITY TO THE WARFIGHTER … NOW!



E-2C forwards targeting information received via HF SIPRNET to best available strike assets in seconds, not minutes.

MOA in progress.

- **OIF Lessons Learned / Mission Need**:
  - "HAWKEYES must be integrated with digital info exchange capabilities."
  - Joint 2nd/3rd Fleet Message demands 100% migration to IP based C5I.
- **Technology Need:** Leveraging FNC KSA multi-national Virtual Operations Capability IP client enables TCP/IP connection over half-duplex HF medium.
- **Stakeholders**: N61, N78, PEO C41& Space (PMW-165, 179; PMA-231), C2/3F
- **System Application**: E-2C, CVN
- **Performing Activity**: SPAWAR SSC; PMA231
- **Benefits/Payoff**: Increased speed and accuracy of C2 information flow from CVN to E-2C (e.g., Time Critical Strike) down from minutes to seconds.

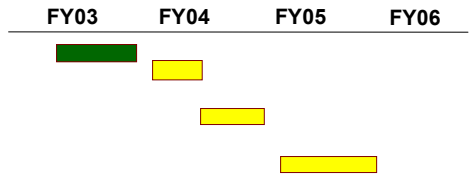
Options

Alternatives Considered	Cost	Integration	Availability	
IP over SATCOM				Voice- saturated circuits
IP over Link 16				Cost, integration challenges
IP over CDL				Severe integration challenge
JTRS				Future development
HF SIPRNET				"Low hanging fruit!"

- ONR KSA FNC project's (Multi-National Virtual Operations Capability) IP Client enables TCP/IP connection over half-duplex HF medium.
- Complete GOTS/COTS solution based on existing Fleet-wide Battle Force Email.
- Successful Flight demonstrations at NAS Patuxent River, Aug '03.

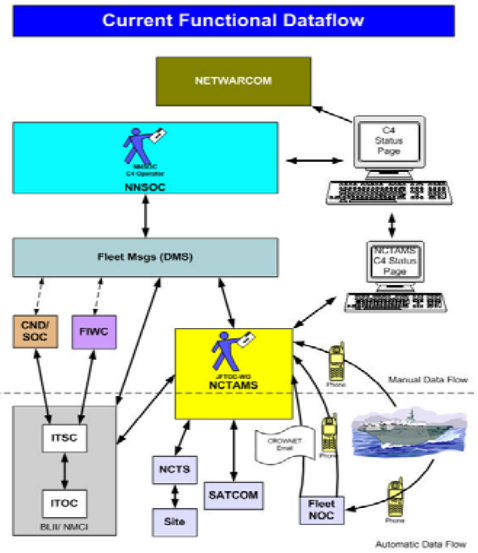
E-2C HF SIPRNET Schedule

1. **Flight Demo**
2. **Squadron/NSAWC Initial Training**
3. **Squadron/CVN Pre-deployment Training**
4. **Squadron/CVN Deployment/Operational Assessment**



TASKS	FY 04	FY05
Software design and integration tasks	$375K	
***IP Client Beta version operational assessment release*		0
***Multiple airborne nodes, increased thru-put, reduced licensing cost*		0
***Digital Targeting Capability Integration*		0
IT-21 Certifications	$260K	0
Project Management	$200K	0
CVN network integration	$300K	0
REQUIRED RTT FUNDS	***$1,135K***	***$0.00***

PEO C4I & SPACE NAVY ENTERPRISE NETWORK MANAGEMENT [#1]



MOA Nearing Completion

Numbered Fleet's #1b IT Requirement – "100% DYNAMIC ALLOCATION OF EXISTING BANDWIDTH, WITH THE REQUISITE TOOLS TO MONITOR AND ANALYZE THE IMPACT(S) OF APPORTIONMENT CHANGES"

Investment buys:

- Improvement to network's operational and security posture
- Single common tool suite for enterprise management, desktop management, software pushes to remote workstations, IAVA tracking, and configuration control of network infrastructure systems

- **Mission Need:** Dynamic, integrated capability to recognize potential network issues and take action before there has been operational impact – Need stated by NETWARCOM, Numbered Fleet, NetOps Common Operational Picture Requirements, and OAG
- **Technology Need:** Provide low cost COTS network management solution that interfaces across all Navy sites & platforms, improving warfighters' ability to manage their computer networks
- **Stakeholders:** N61, PEO C41& Space (PMW-165), NETWARCOM
- **System Application:** ISNS (Networks Afloat and at NOCs)
- **Performing Activity & Process Implementation Sites:** TBD, PEO C4I & Space, NETWARCOM
- **Benefits/Payoff:**
  - Commercial studies indicate moving to automated, enterprise fault identification & isolation tool has improved uptime by 20% and reduced maintenance hours by 25%
  - Ability to recognize potential network issues & take action before operational impact

Options

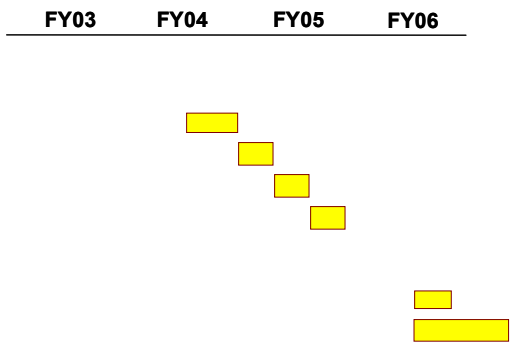
Alternatives Considered	Flexibility	Extensibility	Scalabilty	Cost	Maintainability	Ease of Use	Security
HYPERNOC EMI Engine							
Managed Objects Formula							
AI Metrix NeuralStar							
Others (CA Unicenter,Aprisma, Spectrum xSight, Smarts InCharge, Micromuse Netcool or OpCenter, BMC Patrol	TBD	TBD	TBD	TBD	TBD	TBD	TBD

- Many COTS products exist providing network management solutions from the very basic to the very complicated (Commercial TRL – 9, Military TRL – 5/6)
- Lab integration and testing to down-select the appropriate COTS products and perform necessary integration
- Project will apply standard acceptance criteria across all candidates to find best solution

Navy Enterprise Network Management Program

1.Testing, Selection, Demo
- Lab Integration & Testing
- Initial Demo
- Field to select ESG ships 7 NOCs
- Final fielding at NNWC

2.Incorporate to ISNS Program
- Non-Recurring Engineering
- Field to Platforms



	FY03	FY04	FY05	FY06
RTT		$1,266K	$66K	
ISNS Program Funds				~$460K + TBD OM&N
Total	$0K	$1,266K	$66K	~$460K + TBD OM&N

* Planned POM 06 Request

VIDEO TELECONFERENCING (VTC) OVER IP

Numbered Fleet's #2 IT Requirement –
"100% MIGRATION TO IP BASED C5I…"

Investment buys:
- VIXS solution to end-of-life system (Shipboard Timeplex - 2QFY06), which will disable serial communications off ship
- Ability to easily recover BW allocated to VIXS when the service is not being utilized
- Flexibility in shipboard VTC participation, enabling inter-ship video distribution over existing shipboard C4I Network.

MOA Nearing Completion

- **Mission Need:** Develop IP-based solution for Navy's critical secure VTC capability (VIXS), in order to maximize bandwidth (BW) re-use efficiency, reduce life-cycle costs, and minimize afloat manning requirements
- **Technology Need:** Transition current VIXS suites, based on serial protocols (H-320 standards) to IP solution (H.323) standards
- **Stakeholders:** N61, PEO C41& Space (PMW-165 & 179), Fleet
- **System Application:** VIXS (Navy's secure VTC capability)
- **Performing Activity & Process Implementation Sites:** TBD, PEO C4I &Space
- **Benefits/Payoff:**
  - Reduces Navy costs by 10-12% by recovering wasted BW
  - Leverages BW Optimization efforts, such as Expand Accelerator

Options

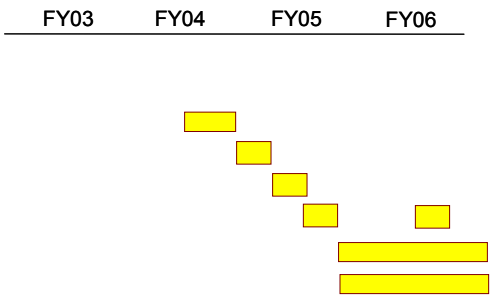
Alternatives Considered	RF connectivity	War-fighter support	Operational Availability	Teleport/DVS-G Interface	Cost
Tandberg	TBD	TBD	TBD	TBD	TBD
Cisco	TBD	TBD	TBD	TBD	TBD
Radvision	TBD	TBD	TBD	TBD	TBD
Polycom	TBD	TBD	TBD	TBD	TBD
New Candidate Technologies	TBD	TBD	TBD	TBD	TBD

- Represents one step in moving voice and video toward consolidated shipboard IP telephony architecture
- Leverage experience of government VTC and IP experts with industry leaders in the VTC transition
- Existing ISDN-based VTC systems afloat and supporting shore infrastructure separate from afloat IP enterprise
  - Wastes "nailed-up" bandwidth on RF SATCOM links when VTCs not on
  - Makes collaboration on shared network files difficult
  - Requires separate operations/maintenance manpower, & support chain.

Navy Enterprise Network Management Program

1.Testing, Selection, Demo
- **Lab Integration & Testing**
- **At-Sea Demo (3 platforms)**

2.Incorporate to ISNS Program
- **RDT&E**
- **Field to Afloat Platforms**
- **Field to Ashore Platforms**

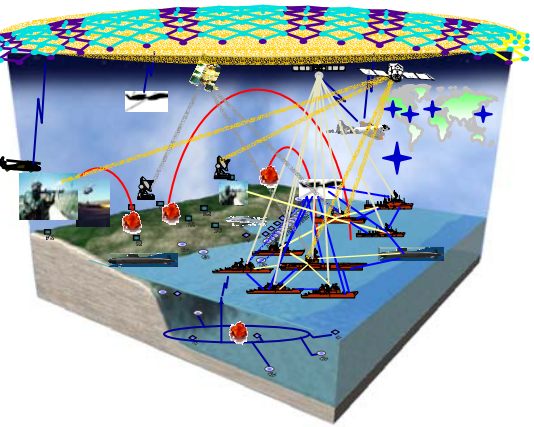


	FY03	FY04	FY05	FY06
RTT		$1,040K		
ISNS Program Funds			*$1,415K	*$1,227K
Total	$0K	$1,040K	*$1,415K	*$1,227K

* PR 05 Submission

WEAPONS DATA LINK (WDL)

Affordable Network Centric Weapons



Include Weapons in the Seamless Information Grid

Dominant & decisive power from the international domain

Focused Effects:
- Precision strike
- Information operations
- Special Forces
- Marines

Seize the initiative
- Disrupt enemy timelines
- Preempt adversary options
- Ensure Operational Success

- **Mission Need:** Long range and extended flight weapons require in flight updates of target location to be effective against relocatable and moving targets. Additionally, Bomb Hit Indication (BHI) is an enabler in Target Assessment meeting the required ROE.
- **Technology Need:** Reduced sized transmit and receive terminals, Dynamic Network Management, Software Communications Architecture
  - Provide flexible networks for Time Critical Strike
  - Improved ability to attack and destroy moving targets with reduced number of assets and less exposure of our forces.
- **Stakeholders:** Requirement – Joint strike forces (Air, Surface, Sub-Surface), Sponsor - N78 and ACC Acquisition – USAF/USN Weapons Offices
- **System application:** JASSM, JSOW, SDB, JDAM, other Navy extended range weapons
- **Performing activities:** AFRL
- **Benefits/Payoff**
  - WDL decreases the Kill Chain against Time Sensitive Targets, reduces the number of weapons required to achieve Kill Probabilities and reduces platform risks in theater of operations

Provide Cueing & Targeting Info **Provide Precision Fires**
Engage Moving Land Targets

JDAM kit
- 100 in^3, 20 lb, BYOP
- AMSTE uses empty cavity (1000 in^3) for SADL, UHF antenna behind fins, thermal battery

JSOW
- 85 in^3, 17 lb, BYOP, antenna options
- AMSTE uses weapon bay for RX-MIDS, L-band antennae above and below; thermal battery

JASSM
- 135 in^3, 20 lb, 200W power, antenna in tail

Small Weapon Applications
- 10 in^3, 2.5 lb, BYOP, antenna TBD

Navy
- Standard Missile-6, Tactical Tomahawk, Harpoon 21

Weapons Data Link Development

	FY03	FY04	FY05	FY06	FY07
Reduced Size Terminal Design					
Spiral 1 - 50 in3, 2-waveform					
Very Reduced Sized Terminal					
Spiral 2 – 10 in3, 4-waveform, full SCA compliance					
Installation and Test				Spiral 1	Spiral 2
Transition to Production/Production					Spiral 1

Terminal Development	2003	2004	2005	2006	Total
Funding Requirements	---	---	---	---	---
1 Contractor Effort (In progress)	**5.4**	12.0	12.0	8.0	37.4
2 Contractor Effort (if supported)	5.4	17.7	23.0	13.9	54.6

FY 03 funding to be placed on single contractor

Weapon Integration and Test NOT Included

Est: $3M Weapon Integration & Test (per weapon type)

$25M Host OFP and fleet integration cost/platform

Summary Technology Transition Deal Descriptions for Proposals Without Quads

PEO (T)
Solid State Scalable Recorder: $2.5M

F/A-18 has incorporated new displays to improve warfighting capability. Recorders are still analog and can not adequately process and record in-flight data for BDA and training. Funds requested will provide for digital recorder that is also scalable to process data from future display acquisitions.

PEO (W)
Firescout: $1.1M

Currently any changes to software either with respect to payload or to the controlling of the vehicle require expensive retesting. By developing software to separate the two functions we could reduce the cost of software upgrades significantly. Not ready until latter part of CY04.

PEO IWS
Assured IP: $2.35M

Need: EMCON or multi-cast environment capable unidirectional IP Broadcasting capability via narrowband access integrated with two-way Fleet SIPRNET Messaging (FSM) and Net Precedence (NETPREC) CUDIX and OTCIXS replacement respectively.

Technology: Channel access protocol (CAP) must be optimized to support a large number of users, with low latency, priority handling, and guaranteed delivery.

Benefit/Payoff: Ability for disadvantages user to broadcast IP in EMCON environment.

Candidate Transition Deal Voting Process

Potential technology transition deals will be presented in two groups: those that are considered most appropriate for application of "1%" funds, and those that are candidates for RTT funding. Both lists consist of potential deals which move technology into acquisition faster than the normal POM process.

Panel members will be asked to 'vote' on the two lists separately. Criteria for ranking include life cycle savings, cost effective delivery of new capability and appropriateness for ASN or RTT "bridge" funding. Each item on the lists may be given points on the scale:

3 – most important
2 – moderately important
1 – least important
0 – insufficient information/no opinion

Each panel member will be allowed to award 3 point scores to at most 5 candidates on each list. Any number of 0, 1 or 2 point scores may be awarded.

The scores of the deal candidates will be averaged ('0' scores will not be included) to arrive at the recommended ranking for each list.

ASN(RDA) FUNDING CANDIDATES - Score Sheet

Acquisition Community	Title	Description	Score
PEO (T)	**A)** Highly Integrated Photonics Wave Division Multiplexing & Support Components	Standards and testing to enable use of optical components on aircraft and surface ships	
PEO (T)	**B)** Tube Transmitter for Advanced Hawkeye	Reduced weight, increased capacity transmitter power amplifiers	
PEO (W)	**C)** Quick Response Tomahawk Mission Planning	Rapid mission route replanning for time critical and relocatable targets	
PEO (W)	**D)** Low Cost Guided Imagery Rocket (LOGIR)	Low cost optical guidance package for existing missiles	
PEO (W)	**E)** Precision Strike Navigation / Inertial Measurement Unit (PSN / IMU)	Improved intertial navigation unit for JSOW	
PEO Ships	**F)** Fuel Cell	Diesel fuel reformer for ship power source with reduced wieght and volume requirements	
PEO Ships	**G)** Fiber Optic Gigbyte Network (FODMS GIGE)	Wide bandwidth Gigabit Ethernet backbone	
PEO Submarines	**H)** Acoustic Comms	Extended range, high bandwidth submerged communications	
PEO Submarines	**I)** Friction Stir Processing	Material processing technique to reduce production cost	
PEO (IWS)	**J)** Low Cost Conformal Array	Active/passive acoustic array to improve shallow water capability	
PEO (CV)	**K)** Aviation Weapons Inventory Mgt Sys (AWIMS)/ Electronic Ouija Board	Weapons management and tracking system to improve weapons throughput and increase sortie rate	
PEO (CV)	**L)** BUSBARS Electrical Distribution	Replacement for power (13.8 kVA) cables to reduce volume, weight and EMI	
PEO (CV)	**M)** Freshwater Flush Sewage Mgt System	Wastewater treatment to reduce storage volume and meet environmental requirements	
PEO (LMW)	**N)** Autonomous Undersea Vehicle	Low-cost, reduced size UUV for surface launched littoral missions	
DRPM (AAAV)	**O)** Portable Fluid Analyzer	Lubricating fluid analyzer giving real-time results to reduce maintenance costs and improve maintenance response times	

RTT FUNDING CANDIDATES - Score Sheet

Acquisition Community	Title	Description	Score
PEO (T)	**AA)** E-2C Garmin	Transponder to enable precision landing and operation in European controlled airspace	
PEO (T)	**BB)** Eddy Current Inspections	Aircraft engine testing equipment to detect microcracking and reduce unneeded overhauls and engine replacements	
PEO (T)	**CC)** F/A 18 Fiber Optic Splicing	Fiber optic cable splicing and testing technology to enable field	
PEO (T)	**DD)** E-2C Auto Air Tasking Order / Airspace Control Order (ATO/ACTO)	Automated data entry capability to eliminate manual entry of ATO data	
PEO (T)	**EE)** F/A 18 Scalable Recorder	Aircraft display recorder to support mission review and training	
PEO (A)	**FF)** Battle Force E-Mail	Aircraft modem to enable transfer of text and imagery	
PEO (A)	**GG)** Increased Bandwidth E-6 Senior Leadership Comm System (SLCS)	Expanded bandwith capability for Senior Leadership aircraft	
PEO (W)	**HH)** Precision Terrain Aided Navigation (PTAN)	High resolution TERCAT gear for Tomahawk to eliminate GPS vulnerability	
PEO (W)	**II)** SLAM Extended Range	Certification of missile capability against relocatable targets	
PEO (W)	**JJ)** Firescout	Modular mission payload to enable mission reconfiguration	
NAVAIR	**KK)** Electronic Obsolescence (2)	Replacement gear to reduce obsolescence in AYK-14 computers	
NAVAIR	**LL)** SCRAM Display Technology	Large format flat panel displays for aircraft	
PEO Ships	**MM)** Metal Matrix Composite Material	Low-wear material for ship shaft seals to reduce replacement and maintenance costs	
PEO (IWS)	**NN)** Human Alerting & Interruption Logistics - Naval Open Architecture **(**HAIL-NOA)	Software for operator alerting on Aegis systems	
	OO) Intentionally left blank		
PEO (CV)	**PP)** Optical Current Transducer	Low-cost, small, external sensor to measure current and voltage on power cables	
DRPM (AAA)	**QQ)** Onboard Vehicle Power	Auxiliary power (8kW) for all Marine vehicles	
PEO C4I & Space	**RR)** Bandwidth Optimization	Improved throughput (2x-4x) for afloat units	
PEO C4I & Space	**SS)** E-2C HF SIPRNET	Airborne C2 platform full TCP/IP, including chat to improve	
PEO C4I & Space	**TT)** Naval Enterprise Network	Fleetwide visibility into IP/RF networks for increased	
PEO C4I & Space	**UU)** VTC over IP	Recoup dedicated VTC bandwidth for all IP functions	
PEO C4I & Space	**VV)** Weapons Data Link	High volume density Link-16 unit for all guided munitions for	
PEO C4I & Space	**WW)** Assured IP	Ability to LPI comms (IP) in EMCON conditions	